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REPTILES & AMPHIBIANS
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THE MARYLAND HERPETOLOGICAL SOCIETY, BULLETIN,



The Maryland Herpetological Society
Department of Herpetology
Natural History Society of Maryland
2643 North Charles Street
Baltimore, Maryland 21218

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MHSB

The Maryland Herpetological Society Bulletin

Herbert S. Harris, Jr.-Advisor and Editor Arnold Norden-CoEditor

Volume I, Number I

27 November 1965

THE MARYLAND HERPETOLOGICAL SOCIETY

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Membership Rates: Active members over 18..\$10.00, under 18..\$6.00,
subscribing members..\$3.00 per year.

Forward

The Maryland Herpetological Society Bulletin is the official publication of the M. H. S., Department of Herpetology of the Natural History Society of Maryland. It will publish papers written by the society members concerning the study of reptiles and amphibians and reprint significant herpetological articles which are no longer available. Papers to be published in the bulletin will be chosen according to the significance of their subject matter and general interest.

Manuscripts being submitted for publication should be typewritten (double spaced) on good quality $8\frac{1}{2}$ x 11 inch paper. There should be a two inch margin at top, bottom and on each side of every page. Submit original and one carbon copy to the editor and retain one copy for yourself. Number all pages. Any illustrations must be line drawings or diagrams. No photographs can be published at this time. Include a scale on any illustrations of specimens or maps. Indicate where illustrations are to appear in the text. Do not use footnotes if they can be avoided. Cite all literature used in your article at the end. These references are to be listed alphabetically, by author.

Manuscripts will be read and a copy will be returned with notice of its acceptability and any suggestions for corrections or revision before publication. Reprints will be available from the society for two cents per page, and should be requested when the revised paper is returned or when notification of the paper's acceptability is received.

Manuscripts may be submitted to Arnold Nerden, Co-Editor, or to Herbert S. Harris, Jr., Advisory Editor. The bulletin will be published quarterly. Papers, for review and revision, should be submitted at least a month before intended publication date. The first volume will contain only one number; volume two will begin with the next bulletin.

Arnold Nerden

Herbert S. Harris, Jr.

Maryland Herpetological Society

Purpose:

To guide the intellectual and aesthetic education of the young and uninitiated in the field of herpetology while attempting to aid the more advanced herpetologist in his work of locating and cataloging information and specimens of the state of Maryland.

Aims:

The conservation of reptiles and amphibians, the appreciation of these animals in their natural state, the general and detailed study of this aspect of Maryland fauna, its place in the total ecological picture, and the dissemination of herpetological knowledge to and from the public and the specialist, are the general aims of this organization.

Suggested Specific Projects

To augment the present study collection of the Natural History Society of Maryland with well preserved, accurately labeled Maryland specimens.

To construct and loan carry-out display cases of latex herptozoa to local schools, scout groups, youth organizations, sportsmens clubs, etc.

To construct a permanent museum display of latex mounts of Maryland herptiles in their natural habitat at the Maryland House and Museum, located at Druid Hill Park, for public reference and enjoyment.

To display small harmless reptiles and amphibians in naturalized terraria and aquaria at local Botanical and Ichthyological shows, fairs, libraries, schools, teacher's meetings, waiting rooms, etc. in short, any place where it can be arranged and is feasible to do so.

To have intelligent, well-versed speakers available to give talks on herpetology when called upon to do so in the interests of the Department of Herpetology of the Natural History Society of Maryland.

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Tentative Program For The First Year

11/6/65	Film	<u>Lampropeltis</u>
11/27/65	Speaker-John Gillespie	<u>Necturus</u> - <u>Ambystoma</u>
12/18/65	Speaker-to be announced	<u>Pseudemys</u> - <u>Clemmys</u>
1/8/66	Speaker-to be announced	<u>Bufo</u> - <u>Rana</u> - <u>Hyla</u>
1/29/66	Film	<u>Kinosternon</u> - <u>Sternotherus</u> - <u>Chelydra</u>
		<u>Elaphe</u>
2/19/66	Speaker-to be announced	
3/12/66	Field Trip	
4/2/66	Speaker-to be announced	<u>Sceloporus</u> - <u>Eumeces</u>
4/23/66	Member's Meeting	
5/14/66	Film	<u>Thamnophis</u> - <u>Natrix</u>
6/4/66	Speaker-to be announced	<u>Plethodon</u> - <u>Cryptobranchus</u>
6/25/66	Field Trip	
7/16/66	Speaker-to be announced	<u>Terrapene</u> - <u>Chrysemys</u>
8/6/66	Film	<u>Diadophis</u> - <u>Pituophis</u> - <u>Storeria</u>
		Rare and foreign Amphibians
8/27/66	Speaker-to be announced	
9/17/66	Field Trip	
10/8/66	Speaker-to be announced	Rare and foreign Reptiles
10/29/66	Member's Meeting	

The field trips will be undertaken with adequate supervision to three directions of the compass. The genera listed on the right side will be displayed at the meeting with a short care-in-captivity and background leaflet available to members concerning them. Herpetological courses to be held on alternating weeks for a nine week total period will be offered.

Distributional Survey: Maryland and the District of Columbia *

by John E. Cooper

Natural History Society of Maryland, and Baltimore City College, Maryland

A report on the combined physiographic and county distribution of both amphibians and reptiles has never before been presented for Maryland and the District of Columbia. Robert H. McCauley's Reptiles of Maryland and the District of Columbia (pub. by author, Hagerstown, Md.) still

* Reprinted from the Philadelphia Herpetological Society Bulletin, Vol 8, No. 3, with permission of the author and the P. H. S. Revised November 1965 by H. S. Harris, Jr. curator, Dept. Herpetology, Natural History Society of Maryland.

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stands as the monumental work on local reptiles, but a great deal of new distributional and other information has accrued in the two decades since its publication. Nothing comprehensive and at the same time reliable has previously been done on the amphibians.

Maryland (including the District of Columbia) is bounded by Delaware and the Atlantic Ocean, Pennsylvania, West Virginia, and the Potomac River, which separates it from West Virginia and Virginia. It covers approximately 10,000 square miles of land surface and nearly 2,400 square miles of water, and is divided into three major physiographic provinces with eight recognizable divisions of these. McCauley (ut supra) reconsidered the herpetologically oriented life zone theories of Cope (1873, Sketch of the Zoology of Maryland, in Walling and Gray's new topographical atlas of Maryland. Philadelphia, O. W. Gray, pp.16-8) and found them more applicable to Maryland than other schemes, recognizing that the fall line is an important limiting factor in local distribution. He considered three faunal areas to be recognizable in Maryland: (1) the Carolinian, which occupies all of the Coastal Plain Province; (2) the Alleghanian, which comprises the rest of the state, exclusive of; (3) the Canadian, which is limited to scattered areas on the highest points of the Alleghany Plateau. The latter are characterized mainly by their flora (including Tsuga canadensis, Picea mariana, and Larix laricina) and have no herpetological features, as far as is known, that would distinguish them from the surrounding Alleghanian Zone.

A comprehensive study of any kind cannot very easily be made without the willing help of many people. I am extremely grateful to the following persons who provided many of the specimens and information upon which this report is based: Mr. Roger Conant, Philadelphia Zoological Society; Mr. James A. Fowler, Cranbrook Institute of Science; Mr. Richard Franz, Parkville Senior High School; Mr. John D. Glaser, Johns Hopkins University; Mr. Frank Groves, Baltimore Zoo; Mr. Jerry D. Hardy, Jr., Natural History Society of Maryland (NHSM); Dr. Robert H. McCauley, Jr., National Institutes of Health; the late Dr. Romeo Mansueti; Mr. Neil D. Richmond, Carnegie Museum; Mr. John Ruppert, NHSM; Dr. Robert Simmons, NHSM; and Dr. Charles J. Stine, Maryland Ornithological Society.

The Amphibians and Reptiles of Maryland and D. C.

Caudata

1. Cryptobranchus a. alleganiensis. Hellbender
2. Notophthalmus v. viridescens. Red-spotted Newt
3. Ambystoma jeffersonianum. Jefferson Salamander
4. Ambystoma maculatum. Spotted Salamander
5. Ambystoma opacum. Marbled Salamander
6. Ambystoma t. tigrinum. Eastern Tiger Salamander
7. Desmognathus f. fuscus. Northern Dusky Salamander
8. Desmognathus o. ochrophaeus. Allegheny Mountain Salamander
9. Desmognathus m. monticola. Appalachian Seal Salamander
10. Plethodon c. cinereus. Red-backed Salamander
11. Plethodon r. richmondi. Ravine Salamander
12. Plethodon g. glutinosus. Slimy Salamander
13. Hemidactylium scutatum. Four-toed Salamander
14. Gyrinophilus p. porphyriticus. Northern Spring Salamander
15. Pseudotriton m. montanus. Eastern Mud Salamander

4.



16. Pseudotriton r. ruber. Northern Red Salamander
17. Eurycea b. bislineata. Northern Two-lined Salamander
18. Eurycea l. longicauda. Long-tailed Salamander
19. Siren lacertina. Greater Siren

Salientia

1. Scaphiopus h. holbrooki. Eastern Spadefoot
2. Bufo a. americanus. American Toad
3. Bufo woodhousei fowleri. Fowler's Toad
4. Acris c. crepitans. Northern Cricket Frog
5. Hyla c. crucifer. Northern Spring Peeper
6. Hyla cinerea. Green Treefrog
7. Hyla femoralis. Pine Woods Treefrog
8. Hyla v. versicolor. Eastern Gray Treefrog
9. Pseudacris triseriata feriarum. Upland Chorus Frog
10. Pseudacris t. kalmi. New Jersey Chorus Frog
11. Pseudacris brachyphona. Mountain Chorus Frog
12. Gastrophryne c. carolinensis. Eastern Narrow-mouthed Toad
13. Rana catesbeiana. Bullfrog
14. Rana virgatipes. Carpenter Frog
15. Rana clamitans melanota. Green Frog
16. Rana p. pipiens. Northern Leopard Frog
17. Rana p. sphenoccephala. Southern Leopard Frog
18. Rana p. palustris. Pickerel Frog
19. Rana s. sylvatica. Wood Frog

Squamata (Sauria)

1. Sceloporus undulatus hyacinthinus. Northern Fence Lizard
2. Cnemidophorus sexlineatus. Six-lined Racerunner
3. Lygosoma laterale. Ground Skink
4. Eumeces fasciatus. Five-lined Skink
5. Eumeces laticeps. Broad-headed Skink
6. Eumeces a. anthracinus. Northern Coal Skink

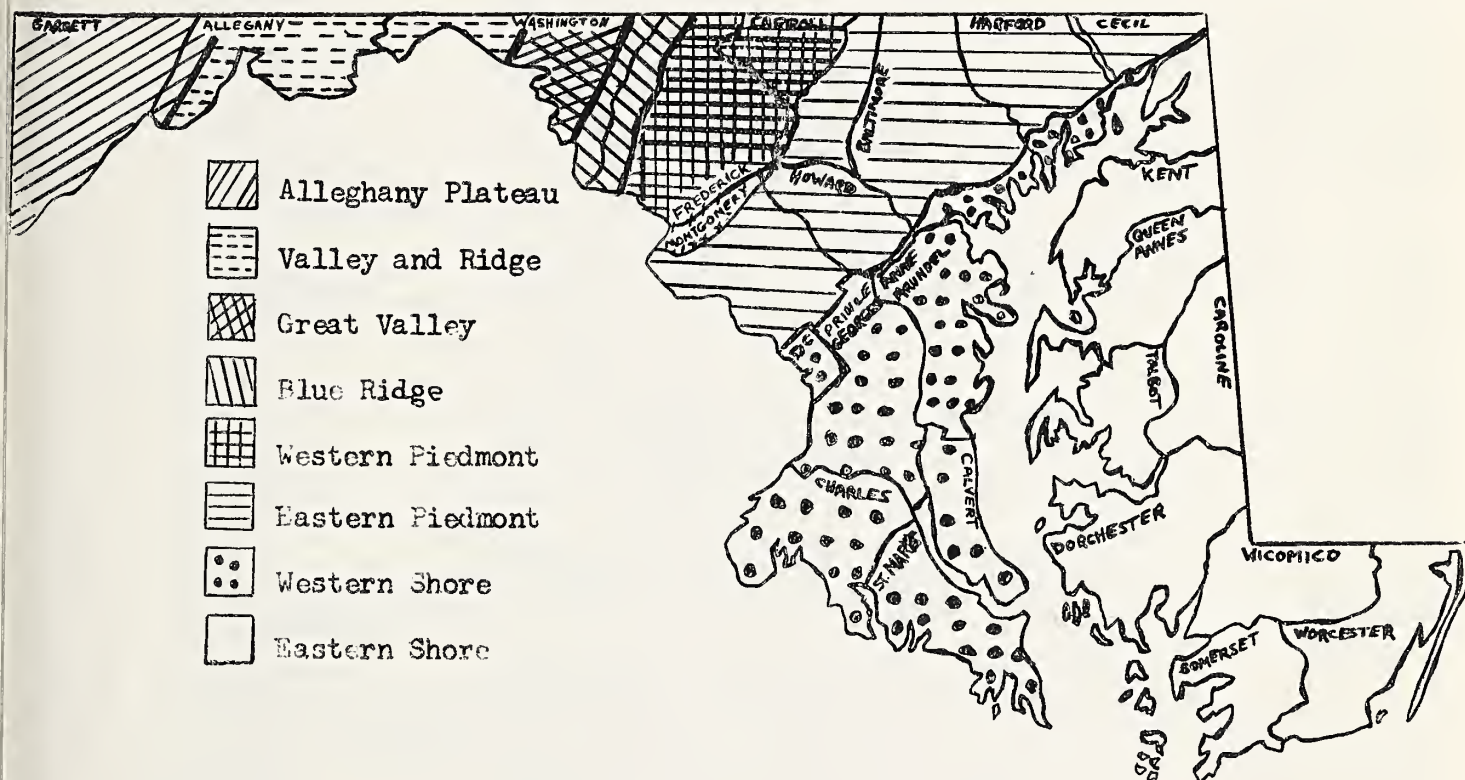
Squamata (Serpentes)

1. Natrix e. erythrogaster. Red-bellied Water Snake
2. Natrix s. sipedon. Northern Water Snake
3. Regina s. septemvittata. (= Natrix septemvittata). Queen Snake
4. Storeria d. dekayi. Northern Brown Snake
5. Storeria o. occipitamaculata. Northern Red-bellied Snake
6. Thamnophis s. sirtalis. Eastern Garter Snake
7. Thamnophis s. sauritus. Eastern Ribbon Snake
8. Haldea v. valeriae (= Virginia v. valeriae). Eastern Earth Snake
9. Haldae v. pulchra (= Virginia v. pulchra). Mountain Earth Snake
10. Heterodon platyrhinos. Eastern Hognose Snake
11. Diadophis p. punctatus X edwardsi. Intergrades between Southern and Northern Ringneck Snakes; Coastal Plain Delmarva
12. Diadophis p. edwardsi. Northern Ringneck Snake
13. Carpophis a. amoenus. Eastern Worm Snake
14. Farancia e. erythrogramma (= Abastor erythrogrammus). Rainbow Snake
15. Coluber c. constrictor. Northern Black Racer
16. Opheodrys aestivus. Rough Green Snake
17. Opheodrys v. vernalis. Eastern Smooth Green Snake

18. Elaphe g. guttata. Corn Snake
19. Elaphe o. obsoleta. Black Rat Snake
20. Pituophis m. melanoleucus. Northern Pine Snake
21. Lampropeltis g. getulus. Eastern Kingsnake
22. Lampropeltis doliata triangulum. Eastern Milk Snake
23. Lampropeltis doliata temporalis. Coastal Plain Milk Snake
24. Lampropeltis calligaster rhombomaculata. Mole Snake
25. Cemophora coccinea. Scarlet Snake
26. Agkistrodon contortrix mokeson. Northern Copperhead
27. Crotalus h. horridus. Timber Rattlesnake

Chelonia

1. Chelydra s. serpentina. Snapping Turtle
2. Sternotherus odoratus. Stinkpot
3. Kinosternon s. subrubrum. Eastern Mud Turtle
4. Clemmys guttata. Spotted Turtle
5. Clemmys muhlenbergi. Bog Turtle
6. Clemmys insculpta. Wood Turtle
7. Terrapene c. carolina. Eastern Box Turtle
8. Malaclemys t. terrapin. Northern Diamondback Terrapin
9. Graptemys geographica. Map Turtle
10. Chrysemys p. picta. Eastern Painted Turtle. Intergrades with C. p. marginata, Midland Painted Turtle, in extreme western Maryland.
11. Pseudemys c. concinna. River Cooter. Feral (?)
12. Pseudemys scripta elegans. Red-eared Turtle. Feral.
13. Pseudemys scripta troosti. Cumberland Turtle. Feral.
14. Pseudemys f. floridana. Florida Cooter
15. Pseudemys rubriventris. Red-bellied Turtle
16. Chelonia m. mydas. Atlantic Green Turtle
17. Eretmochelys i. imbricata. Atlantic Hawksbill (?)
18. Caretta c. caretta. Atlantic Loggerhead
19. Lepidochelys kempi. Atlantic Ridley (?)
20. Dermochelys c. coriacea. Atlantic Leatherback (?)
21. Trionyx s. spinifer. Eastern Spiny Softshell (?)



MARYLAND

SCALE STATUTE MILES
0 10 20 30 40

REPTILIA

(Con'd on page 10)

	Allegany	Anne Arundel	Baltimore	Caroline	Carroll	Calvert	Cecil	Charles	District of Columbia	Dorchester	Frederick	Garrett	Harford	Howard	Kent	Montgomery	Prince George's	Queen Anne's	Somerset	St. Mary's	Talbot	Washington	Wicomico	Worcester
<i>S. u. hyacinthinus</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>L. laterale</i>		X				X		X	X	X							X		X	X			X	X
<i>E. a. anthracinus</i>	5											X												
<i>E. fasciatus</i> ⁶	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
<i>E. laticeps</i>		X				X	³⁷	X		X	X					X	X	X	X	X		X		X
<i>C. sexlineatus</i>		X	²²			X		X	X								X			X				
<i>C. a. amoenus</i>	X	X	X	³⁸	⁷	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
<i>F. e. erythrogramma</i>								⁸																
<i>D. p. punctatus-edwardsi</i> ⁹				³⁹			X			X								X			X			X
<i>D. p. edwardsi</i>	X	X	X		X	X	X	X	X		X	X	X	X		X	X			X		X		
<i>H. platyrhinos</i>	X	X	X	X	⁵¹	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
<i>O. aestivus</i>		X	X	X		X	X	X	X	X			X	⁴⁰		X	X	X	X	X	X	X	X	X
<i>O. v. vernalis</i>	X										X	X										X		
<i>C. c. constrictor</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	⁴²	X	X
<i>E. g. guttata</i>		X	⁴¹			X		X	X							X	X			X	X		X	
<i>E. o. obsoleta</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>P. m. melanoleucus</i>																							¹⁰	
<i>L. c. rhombomaculata</i> ¹¹		X						²¹	X							X	X			²¹				
<i>L. g. getulus</i>		X	X			X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X
<i>L. d. triangulum</i> ¹²	X	X	X		X		X		X		X	X	X	X		X	X					X		
<i>L. d. temporalis</i>		X				X		X	X								X			X				X
<i>C. coccinea</i>		X	¹³			X			X								X						X	
<i>T. s. sirtalis</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>T. s. sauritus</i>	X	X	X	X	⁴⁶	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>H. v. valeriae</i>		X	X		X	X	X	X	X		X		X	X	X	X	X			X		X	X	X
<i>H. v. pulchra</i>												X												
<i>S. d. dekayi</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X
<i>S. o. occipitumaculata</i>	X	X	⁴⁴			X	X	X	X		X	X		X				X		X		X	X	X
<i>N. e. erythrogaster</i>																							X	
<i>R. s. septemvittata</i>	X	X	X				X		X		X	X	X	X	X	X	X					X		
<i>N. s. sipedon</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>A. c. contortrix-mokesen</i>																			¹⁴					
<i>A. c. mokesen</i>	X	X	X		X	X	X	X	X		X	X	X	X		X	X			X		X	X	X
<i>C. h. horridus</i>	X		X								X	X			¹⁵							X		
<i>C. s. serpentina</i>	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
<i>S. odoratus</i>	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X		X		X	X	X
<i>K. s. subrubrum</i>		X	X	X		X	X	X	X	X			X	X	X	X	X	X		X	X			X
<i>C. guttata</i>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
<i>C. insculpta</i>	X		X				X				X	X	X								¹⁶	X		
<i>C. muhlenbergi</i>			X				X						X											
<i>T. c. carolina</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>M. t. terrapin</i>		X				X			X	X					X			X	X		X		X	X

REPTILIA (Cont'd on page 10)	APPALACHIAN PROVINCE				PIEDMONT PROVINCE		COASTAL PLAIN PROVINCE	
	Alleghany Plateau	Valley and Ridge	Great Valley	Blue Ridge	Western Division	Eastern Division	Western Shore (Inner Division)	Eastern Shore (Outer Division)
S. u. hyacinthinus		X	X	X	X	X	X	X
L. laterale							X	X
E. a. anthracinus	X	?						
E. fasciatus	X	X	X	X	X	X	X	X
E. laticeps				X	X	X	X	X
C. sexlineatus							X	
C. a. amoenus		X	X	X	X	X	X	X
F. e. erythrogramma							X	
D.p.punctatus-edwardsi							?	X
D. p. edwardsi	X	X	X	X	X	X	X	
H. platyrhinos	?	X	X	X	X	X	X	X
O. aestivus			X			X	X	X
O. V. vernalis	X	X	X	X	X			
C. c. constrictor	X	X	X	X	X	X	X	X
E. g. guttata						?	X	X
E. o. obsoleta	X	X	X	X	X	X	X	X
P. m. melanoleucus								X
L. c. rhombomaculata						X	X	
L. g. getulus						X	X	X
L. d. triangulum	X	X	X	X	X	X	X	?
L. d. temporalis							X	X
C. coccinea						?	X	X
T. s. sirtalis	X	X	X	X	X	X	X	X
T. s. sauritus	X	X	X	X	X	X	X	X
H. v. valeriae		X			X	X	X	X
H. v. pulchra	X							
S. d. dekayi	X	X			X	X	X	X
S. o. occipitomaculata	X	X			X	X	X	X
N. e. erythrogaster								X
R. s. septemvittata	X	X	X	X	X	X	X	X
N. s. sipedon	X	X	X	X	X	X	X	X
A.c.contortrix-mokeson							X	X
A. c. mokeson	X	X	X	X	X	X	X	X
C. h. horridus	X	X	X	X	X	X		
C. s. serpentina	X	X	X	X	X	X	X	X
S. odoratus	X	X	X	X	X	X	X	X
K. s. subrubrum						X	X	X
C. guttata	X		X	X	X	X	X	X
C. insculpta	X	X	X	X	X	X		
C. muhlenbergi						X		
T. c. carolina	X	X	X	X	X	X	X	X
M. t. terrapin							X	X

REPTILIA CONT'D (from page 8)	Allegany	Anne Arundel	Baltimore	Caroline	Carroll	Calvert	Cecil	Charles	District of Columbia	Dorchester	Frederick	Garrett	Harford	Howard	Kent	Montgomery	Prince George's	Queen Anne's	Somerset	St. Mary's	Talbot	Washington	Wicomico	Worcester
<i>C. p. picta</i> ¹⁷	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
<i>P. f. floridana</i>		X						X	X							X								
<i>P. rubriventris</i>	X	24				X	X		X				23			X	X	X		X		X	X	X
<i>G. geographica</i>							X						X											
<i>T. s. spinifer</i> ¹⁸											X													
<i>C. m. mydas</i>						X																		
<i>E. i. imbricata</i>	Atlantic; no specific Maryland records.																							
<i>C. c. caretta</i>		19				X			X															X
<i>L. kemp</i>	Atlantic; no specific Maryland records.																							
<i>D. c. coriacea</i>	Chesapeake and Atlantic; no specific Md. records.																							
FERAL																								
<i>P. c. concinna</i> ²⁰		X																						
<i>P. s. elegans</i>		X	X																					
<i>P. s. troosti</i>			X																					

REPTILIA CONT'D (from page 9)	Alleghany Plateau	Valley and Ridge	Great Valley	Blue Ridge		Western Division	Eastern Division		Western Shore (Inner Division)	Eastern Shore (Outer Division)
<i>C. p. picta</i>		X	X	X		X	X		X	X
<i>C. p. picta-marginata</i>	X	X								
<i>P. f. floridana</i>							X		X	
<i>P. rubriventris</i>		X		X			X		X	X
<i>G. geographica</i>							X			X
<i>T. s. spinifer</i>	?									
<i>C. m. mydas</i>									X	
<i>E. i. imbricata</i>									Atlantic	
<i>C. c. caretta</i>									X	X
<i>L. kemp</i>									Atlantic	
<i>D. C. coriacea</i>									Chesapeake and Atlantic	
FERAL										
<i>P. c. concinna</i>									X	
<i>P. s. elegans</i>							X		X	
<i>P. s. troosti</i>							X			

AMPHIBIA	Allegany	Anne Arundel	Baltimore	Caroline	Carroll	Calvert	Cecil	Charles	District of Columbia	Dorchester	Frederick	Garrett	Harford	Howard	Kent	Montgomery	Prince George's	Queen Anne's	Somerset	St. Mary's	Talbot	Washington	Wicomico	Worcester
<i>C. a. alleganiensis</i>							X				X	1												
<i>N. v. viridescens</i>	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X			X	X	X		
<i>A. jeffersonianum</i>	X																					X		
<i>A. maculatum</i>	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X		
<i>A. opacum</i>	X	X	X	43		X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X
<i>A. t. tigrinum</i>	26		X					X		X					X		X						31	
<i>E. b. bislineata</i>	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X	36	X	X	
<i>E. l. longicauda</i>	X		X		X		X				X	X	X	X		X						X		
<i>H. scutatum</i>	X	X	X	X		X	X	X	X	X	X	X	X	X		X	X			X		X	X	X
<i>P. c. cinereus</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
<i>P. r. richmondi</i>	X																				25			
<i>P. g. glutinosus</i>	X		X		X		X				X	X	X			X						X		
<i>G. p. porphyriticus</i>	X										X	X										X		
<i>P. m. montanus</i>		X	X			X		X	X							X	X	X		X			X	
<i>P. r. ruber</i>	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X			X	X	X		
<i>D. f. fuscus</i>	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	
<i>D. o. ochrophaeus</i>	X											X												
<i>D. m. monticola</i>	X											X												
<i>S. lacertina</i>									2															
<i>S. holbrooki holbrooki</i>		X		X		X		X	X	X	X			X		X			X				X	X
<i>B. a. americanus</i>	X	X	X		X	X	X	X	X		X	X	X	X		X	X					X	X	X
<i>B. w. fowleri</i>	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
<i>A. c. crepitans</i>	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
<i>P. brachyphona</i>	27										X													
<i>P. t. kalmi</i>				X			28			X				28			X	X		X		X	X	
<i>P. t. feriarum</i>	X	X	X		X	X		X	X	29		28	X		X	X			X		X			
<i>H. cinerea</i> 33		X	X			X	X	X	X	X		X		X	X	X			X	X		X	X	
<i>H. c. crucifer</i>	30	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>H. v. versicolor</i>	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X
<i>H. femoralis</i>						3																		
<i>R. catesbeiana</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	45	X	X	X	X	X	X
<i>R. c. melanota</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>R. p. palustris</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			34	X	X	X	
<i>R. p. pipiens</i>	X		X		X		X				X	X	X	X		X						X		
<i>R. p. sphenoccephala</i> 4		X		X		X		X	X	X				X		X	X	X	X	X		X	X	
<i>R. s. sylvatica</i>	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		35	X	X	X	
<i>R. virgatipes</i>										X													X	X
<i>G. c. carolinensis</i>						X				X									X					

AMPHIBIA	APPALACHIAN PROVINCE				PIEDMONT PROVINCE		COASTAL PLAIN PROVINCE	
	Alleghany Plateau	Valley and Ridge	Great Valley	Blue Ridge	Western Division	Eastern Division	Western Shore (Inner Division)	Eastern Shore (Outer Division)
C. a. alleganiensis	X					X		
N. v. viridescens	X	X	X	X	X	X	X	X
A. jeffersonianum	X	X						
A. maculatum	X	X	X	X	X	X	X	X
A. opacum		X	X	X	X	X	X	X
A. t. tigrinum							X	X
E. b. bislineata	X	X	X	X	X	X	X	X
E. l. longicauda	X	X	X	X	X	X		
H. scutatum	X	X	X		X	X	X	X
P. c. cinereus	X	X	X	X	X	X	X	X
P. r. richmondi	X	X						
P. g. glutinosus	X	X	X	X	X	X		
G. p. porphyriticus	X	X	X	X	X			
P. m. montanus						X	X	X
P. r. ruber	X	X	X	X	X	X	X	X
D. f. fuscus	X	X	X	X	X	X	X	X
D. o. ochrophæus	X	X						
D. m. monticola	X	X						
S. lacertina							X	
S. h. holbrooki					X		X	X
B. a. americanus	X	X	X	X	X	X	X	X
B. w. fowleri	X	X	X	X	X	X	X	X
A. c. crepitans		X	X	X	X	X	X	X
P. brachyphona	X	X						
P. t. kalmi								X
P. t. feriarum		X	X	X	X	X	X	
H. cinerea						X	X	X
H. c. crucifer	X	X	X	X	X	X	X	X
H. v. versicolor	X	X				X	X	X
H. femoralis							X	
R. catesbeiana		X		X	X	X	X	X
R. c. melanota	X	X	X	X	X	X	X	X
R. p. palustris	X	X	X	X	X	X	X	X
R. p. pipiens	X	X	X	X	X	X		
R. p. sphenoccephala							X	X
R. s. sylvatica	X	X			X	X	X	X
R. virgatipes								X
G. c. carolinensis							X	X

Maryland Distribution Survey, concluded.

Numbers in spaces (mainly after number 19), represent new records and information.

1. Principally taken in Susquehanna River between Harford and Cecil Counties; specific records for Harford tributaries lacking.
2. Based on very old record for Potomac Flats (Hay, 1902); presumably extirpated in our area.
3. Single occurrence; reported by Fowler and Orton (1947) from cypress swamp near Battle Creek, Has since been diligently sought, but never found.
4. All Coastal Plain populations are presumed to be this subspecies; no accurate study as yet made.
5. Very old specimen, labeled "Alleghany County" in ANSP collection.
6. Found in disjunct population except in Coastal Plain: decidedly rare on Alleghany Plateau.
7. Single specimen, labeled simply " Carroll County".
8. Three specimens, taken close together at Stump Neck in 1937, one additional specimen from near Newburg in 1960 (Chesapeake Science 1 (3-4):203-204)
9. Coastal Plain Delmarva populations are intermediate between these two subspecies.
10. No specimens in existence, hence records may not be valid; a single report from Queen Anne's County has been discounted.
11. Extremely limited in distribution and not found throughout the counties from which recorded.
12. Precise area of intergradation with temporalis not yet clear; specimens with characteristics of both forms occur as far north as Carroll County and as far south as southern Anne Arundel and Prince George's Counties.
13. Based on old specimen in Museum of Comparative Zoology at Harvard collected in "Baltimore" in 1862 by Prof. A. Wyatt.
14. Specimens from the southern parts of this county exhibit obvious contortrix influences.
15. Single specimen, most likely an escape.
16. Single specimen, considered to be an escape.
17. Specimens from Garrett and Allegany Counties show evidence of intergradation with C. p.marginata.
18. Based on old and as yet unsubstantiated accounts.
19. Found in Baltimore City near the harbor; probably in from Chesapeake or Atlantic by boat. Quite frequently found on coastal beaches.
20. Four specimens of this species have come to my attention. Two are from near Elkridge, and one from the intersection of the Patapsco River and the Baltimore-Washington Parkway and the last from an area off Fort Smallwood Road. All four were juveniles. At this time it is not known whether or not this is a ferral or an indigenous form in Maryland.
21. South of Pomfret, and at Cedarville State Forest in Charles County; Piney Point and near Leonardtown in St. Mary's County. See Herp. 17 (2):141.
22. Junction of Hawkins Pt. Road and Chemical Road, Curtis Bay, Baltimore City. Collected by H. Harris, Jr.
23. Susquehanna River, near U. S. Rt. 40, Preserved in H. Harris, Jr. collection (RT 54 HSH)
24. Swan Creek, Brandon Shores, specimen collected by Ken Hammond and Mike Crotty and brought to H. Harris, Jr.; South of Glen Burnie, Ken Nemuras

(specimen seen by H. Harris, Jr.); also additional sight records from Anne Arundel County, by Ken Nemuras (P. H. S. B. 12(1-4): 50-51)

25. Dr. Richard Highton of University of Maryland informs of a specimen from 5 miles E. of Hancock.
26. Single specimen, donated to Baltimore zoo in September 1962. Specimen found near Arnold by Mrs. Grace Moyle.
27. Collected 6 miles W. Cumberland on U. S. Rt. 40 by Richard Franz and preserved in his collection (LRF 656-661).
28. The Cecil County specimen was collected 0.1 mi. E. of junction of Md. Rt. 391 and Md. Rt. 395 by Richard Franz.
*The Pseudacris in Harford, Cecil and Kent counties show intermediate characters of feriarum and kalmi. This group and its problems are under present study by Richard Franz. His paper will appear later this year in another journal.
29. Collected 3 mi. E. of Md. Rt. 77, along the Monocacy River by Richard Franz (LRF 649-651).
30. Collected at Lonaconing by Richard Franz (LRF 915-917).
31. Collected near Bishopville, Charles J. Stine, Jr.
32. Frank Groves of the Baltimore Zoo, records two specimens from this county.
33. The suppressed form Hyla c. evittata was said to occur along the upper tide water Potomac only, with the rest of the coastal plain population in Maryland and on the Delmarva Peninsula being intergrades. This form should be kept in mind until enough material from the upper tide-water area of the Potomac is investigated to either confirm the suppression or prove it to be a valid subspecies.
34. Near Skipton, collected by John Gillespie.
35. 7 mi. E. Easton, collected by John Gillespie.
36. Near Skipton, collected by John Gillespie.
37. Single specimen known, a juvenile with seven stripes, collected by John Gillespie.
38. Collected by Frank Groves, near Denton.
39. Collected by Frank Groves, near Denton.
40. One specimen collected by Frank Groves in Howard County, near Laurel, Prince George's County; another specimen is from Avalon, Patapsco State Park, Howard County, by H. Harris, Jr.
41. Frank Groves informs of a specimen collected about 4 mi. S. of Loch Raven Dam (summer 1957), which laid fertile eggs. This is the only specimen known from this area. The corn snake appears to be a coastal plain form in Maryland.
42. Collected at Big Pool by Frank Groves.
43. Frank Groves collected recently transformed individuals near Denton.
44. Catonsville, collected by Dr. Romeo Mansueti, 1941.
45. Collected 1 mi. N. of junction of Md. Rt. 413 and Md. Rt. 13, on Md. Rt. 13 by Richard Franz (LRF 1474).
46. Collected S. of Sykesville along N. bank of the Patapsco River, by William Roeder.

Ed. note: specimens representing new county records should be sent, alive or preserved with full collecting data, to:

Herbert S. Harris, Jr.
Curator of Herpetology
Natural History Society of Maryland
2643 N. Charles Street
Baltimore, Maryland 21218

7P

BULLETIN OF THE MARYLAND HERPETOLOGICAL SOCIETY

Volume 2, Nos. 1-4

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BULLETIN OF THE MARYLAND HERPETOLOGICAL SOCIETY

The Maryland Herpetological Society
Department of Herpetology
Natural History Society of Maryland
2643 North Charles Street
Baltimore, Maryland 21218

MHSB

Bulletin of the Maryland Herpetological Society

Herbert Harris, Jr.-Advisor and Editor

James G. Kimos-Editor

Volume 2, Number I

31 March 1966

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Conservation---Patapsco State Park

The rocky terrain, the wooded hillsides and the many streams flowing to the Patapsco River all add up to give Patapsco State Park a wide variety of amphibians and reptiles. It has supplied the Baltimore herpetologist, both amateur and professional, with an area close enough that he does not have to own an automobile in order to collect. At least it did! At the present rate, Patapsco State Park is slowly but surely becoming a wasteland as far as herpetofauna is concerned. Who is responsible for this catastrophe of the herpetozoa world? Some misinformed persons killing all the snakes they see? Some animal predator with an outlandish appetite only for amphibians and reptiles? Some deadly insecticide that may kill anything that comes in contact with it? No! Then who is? We and our fellow collectors, both amateur and professional, are responsible. This is a true and bitter fact. The total number of these animals destroyed by the previously mentioned causes can hardly compare to the amount of damage caused by a few glutinous collectors.

Patapsco has suffered greatly from over-collecting of amphibians and reptiles. Perhaps the Patapsco State Park's problems could be solved if it weren't located so near the city, but there is no way to transport the park to an area where it wouldn't be accessible to local collectors. Therefore, it is up to us to right the wrong that we have done. There is small chance that all animals you collect will be of value or of great interest to herpetologists, so why bring them all home? I'm sure that everyone knows what a Black Rat Snake looks like, and that your eight inch Milk Snake is not going to bring any credit to your "herp ego". So if there is not a specific purpose for collecting a specimen, why bring it back? Why not leave it there for others to enjoy? If this is done, Patapsco State Park will have a chance to increase it's populations of herpetological specimens, and we will be able to enjoy it for many years to come.

Other than the Maryland State Laws regarding the collecting of certain turtles and frogs, there are no specific regulations on the collecting of amphibians and reptiles in Maryland State Parks. There is, however, a regulation stating that the hunting of animals is prohibited in Maryland State Parks, and amphibians and reptiles are certainly animals. The park officials try hard to cooperate with interested persons and groups in the field of herpetology by allowing some collecting. But, if the over-collecting continues, they will be forced to strongly apply this existing law on animal collecting.

This conservation project will take the cooperation of all of us, and if it is followed, perhaps in a few years the park will be as abundant in herpetological life as it once was.

---David Saul, 1404 Haubert Street, Baltimore, Maryland 21230

Herpetofauna Conservation: Can It Succeed?

Most herpetologists, amateur or professional, will agree that there is a need for conservation if many species and subspecies of amphibians and reptiles are to survive. There is great disagreement, however, on how conservation should be practiced. Some herpetologists believe that the spreading metropolis will devour all herpetozoa-sustaining lands, making conservation impossible. Others believe that a great reduction in collecting will save these animal populations in state and national parks.

Those who fear the spread of urban areas have just reason for concern. Each year, growing suburban developments, manufacturing facilities, and expressways claim countless acres of land, formerly inhabited by amphibians and reptiles. Few of these animals adapt to the new environment. Many herpetologists have to drive many miles to observe specimens which were once common in nearby areas. It is doubtful that the spread of urban areas will cease just because of the efforts of herpetologists. In many areas where there are amphibians and reptiles today, there will be none tomorrow.

Can herpetologists permanently preserve herpetofauna in state and national parks by agreeing among themselves not to over-collect there? No! Our parks, while safe from urbanization, are becoming increasingly crowded with visitors during the warm months. Thousands of youngsters roam through the woods with little respect for conservation. They collect or destroy anything that interests them, including thousands of amphibians and reptiles.

Patapsco State Park is a prime example of this situation. A decade ago this park drew good crowds but they were small enough not to be a threat to the animal populations. Collecting was still good in the more remote areas of the park. As the crowds grew, park facilities spread into these less developed areas. In Patapsco State Park on a warm sunny day in spring, hundreds of visitors tramp through the woods and along the nature trails. It is little wonder that the once abundant wildlife has decreased! The idea that the agreement by a few amateur or professional herpetologists not to over-collect in the parks will save the native populations is nonsense.

Is conservation then doomed to failure? Again the answer is no. We can do what zoologists, botanists, and ornithologists have been doing for years. That is, to establish sanctuaries. This would provide for small areas with varied habitats of the two main Maryland faunal types. It could insure protection, and supply specimens for museums and zoos in years to come. In areas other than the preserves, collecting should not be condemned altogether. It is far better for a specimen to be in the hands of even an amateur herpetologist than to be wiped out by the spread of urban areas or to be kept as a curiosity by someone not interested in herpetology. William G. Roeder, 2024 Ramsey Street, Baltimore, MD.

Conservation Laws For Herpetology

With the increasing number of people interested in herpetology, there is a need for conservation laws to insure the preservation of amphibians and reptiles. Among us there are a few collectors who practice a most disgusting and harmful form of collecting. That is, taking every specimen they catch, just so they will not go home empty-handed. These people have no consideration of the effect that this might have on the amphibians and reptiles of the area. These irresponsible people represent only a few collectors. The majority are concerned about the amount of damage over-collecting is causing.

With this in mind, the following rules are suggested. I hope every collector will use them as game laws on all field trips.

1. Leave all habitats in the same condition as you found them, by replacing rocks, logs, etc.
2. Limit yourself to taking only the number of specimens that are absolutely necessary.
3. Under no condition, should an area be stocked with herpetofauna, even if they are native to it!

When some of us stop to think of the number of times we have seen good collecting areas turned into mediocre ones because of a few thoughtless collectors, we can see how these three simple rules can benefit the study of herpetology. By insuring that the herpetofauna have intact habitats, limiting the number of herpetozoa collected to those absolutely necessary, and by eliminating the addition of a new predator or food competitor, we are almost guaranteed that the next time we want to collect in an area, it will be a worth while venture.

---David Saul, 1404 Haubert Street, Baltimore, Maryland 21230

A Checklist of the Amphibians and Reptiles of Patapsco State Park,
Baltimore and Howard Counties, Maryland.

The Patapsco State Park is located along the Patapsco River where the river separates Baltimore and Howard Counties. This gives the park approximately a central location within the state. Patapsco State Park extends from the Fall Line in a north westerly direction, which places it in the Eastern Piedmont Province, although its southernmost end does encroach the Coastal Plain Province. This park is divided into two main sections, the Upper and Lower Patapsco State Parks. There are six designated areas. In the Lower Patapsco State Park the areas of Avalon and Glen Artney are the southernmost, with Orange Grove and the Hilton Avenue Area being centrally located within the length of the lower park. In the Upper Patapsco State Park there is Hollowfield and the Gov. Theodore R. McKeldin Recreational Area, with the latter being the northernmost designated area. Totally the park comprises approximately 6,278 acres.

There are breeding ponds for amphibians, and rock ledges with dens for hibernating reptiles. There are a number of streams and springs which flow to the Patapsco River. The Patapsco State Park in all, has many diversified habitats for the large number of amphibians and reptiles found there.

This checklist records 34 genera, consisting of 49 species and subspecies, that have been recorded from the Patapsco State Park. There are 11 salamanders, 11 frogs, 2 lizards, 15 snakes and 10 turtles.

Checklist of Amphibians and Reptiles Collected in Patapsco State Park.

Caudata

1. Notophthalmus v. viridescens-Red-spotted Newt
2. Ambystoma maculatum-Spotted Salamander
3. Ambystoma opacum-Marbled Salamander
4. Desmognathus f. fuscus-Northern Dusky Salamander
5. Plethodon c. cinereus-Red-backed Salamander
6. Plethodon g. glutinosus-Slimy Salamander. Three specimens were collected at Avalon in July 1950 by Howard Campbell. Specimens have since been lost; none exist in permanent collections (see note).
7. Hemidactylium scutatum-Four-toed Salamander. This salamander is not too common in Patapsco State Park.
8. Pseudotriton m. montanus-Eastern Mud Salamander. This species has been reported to occur along with Pseudotriton r. ruber in springs in the Glen Artney area, by John E. Cooper(per. comm.).

9. Pseudotriton r. ruber-Northern Red Salamander
10. Eurycea b. bislineata-Northern Two-lined Salamander
11. Eurycea l. longicauda-Long-tailed Salamander

Salientia

1. Bufo a. americanus-American Toad
2. Bufo woodhousei fowleri-Fowler's Toad
3. Acris c. crepitans-Northern Cricket Frog. This frog is not very common in the park.
4. Hyla c. crucifer-Northern Spring Peeper
5. Hyla v. versicolor-Eastern Gray Tree Frog
6. Pseudacris triseriata feriarum-Upland Chorus Frog
7. Rana catesbeiana-Bullfrog
8. Rana clamitans melanota-Green Frog
9. Rana pipiens sphenoccephala-Southern Leopard Frog. This frog is rather rare in the park. It also probably intergrades to some extent with Rana p. pipiens in the northern part of the park.
10. Rana p. palustris-Pickerel Frog
11. Rana s. sylvatica-Wood Frog

Squamata (Sauria)

1. Sceloporus undulatus hyacinthinus-Northern Fence Lizard
2. Eumeces fasciatus-Five-lined Skink, a rare lizard in the park.

Squamata (Serpentes)

1. Natrix s. sipedon-Northern Water Snake
2. Regina s. septemvittata-Queen Snake
3. Storeria d. dekayi-Northern Brown Snake
4. Thamnophis s. sirtalis-Eastern Garter Snake
5. Thamnophis s. sauritus-Eastern Ribbon Snake
6. Haldea v. valeriae-Eastern Earth Snake
7. Heterodon platyrhinos-Eastern Hognose Snake. This snake is not very common in the state park.
8. Diadophis punctatus edwardsi-Northern Ringneck Snake
9. Carphophis a. amoenus-Eastern Worm Snake
10. Coluber c. constrictor-Northern Black Racer
11. Opheodrys aestivus-Rough Green Snake
12. Elaphe o. obsoleta-Black Rat Snake
13. Lampropeltis g. getulus-Eastern Kingsnake. This snake is not common in the Patapsco State Park.
14. Lampropeltis dolia triangulum-Eastern Milk Snake. Snakes of this subspecies show some extent of intergradation with L. d. temporalis along both sides of the Fall Line in the state of Maryland.
15. Ancistrodon contortrix mokeson-Northern Copperhead

Chelonis

1. Chelydra s. serpentina-Common Snapping Turtle

2. Sternotherus odoratus-Stinkpot
3. Kinosternon s. subrubrum-Eastern Mud Turtle
4. Clemmys guttata-Spotted Turtle
5. Clemmys insculpta-Wood Turtle. This turtle is included in the herpetofauna of Patapsco State Park since three specimens have been collected. (See note) No specimens exist in a recognized collection.
6. Terrapene c. carolina-Eastern Box Turtle
7. Chrysemys p. picta-Eastern Painted Turtle
8. Pseudemys scripta elegans-Red-eared Turtle. This turtle is a feral in Maryland.
9. Pseudemys scripta troosti-Cumberland Turtle. This turtle is also a feral in the state.
10. Pseudemys rubriventris-Red-bellied Turtle. Specimens of this turtle have been seen and observed below the first dam in the Lower Patapsco State Park. (See note) No specimens from the Patapsco State Park exist in recognized collections.

Note: Three of the herpetozoa listed in this checklist represent possible new county records. They were reported either seen or collected in the state park. Since no specimens exist in recognized collections they cannot at this time be added to the list of "New County Records for Maryland". The three are:

1. Plethodon g. glutinosus-Howard County
2. Clemmys insculpta-Howard County
3. Pseudemys rubriventris-Baltimore and Howard Counties

Even though these three probably do occur here, it is also possible that some may have been released since the park is so popular with visitors. These three animals should be looked for in other parts of the counties as well as in the Patapsco State Park sections.

Probable List

Caudata

1. Ambystoma t. tigrinum-Eastern Tiger Salamander. This is a secretive salamander and is very spotty in distribution. It has only been collected in two counties on the western shore, Charles and Anne Arundel. Only one specimen to date is known from the latter county. It may very possibly occur in the state park area.

Salientia

1. Scaphiopus h. holbrooki-Eastern Spadefoot. In our area this species skips from Anne Arundel County to Frederick County, hence it very possibly may turn up in Patapsco State Park and surrounding counties.

Squamata (Sauria)

1. Cnemidophorus sexlineatus-Six-lined Race runner. Specimens of this lizard have been collected near Elkridge, but not yet in the Patapsco State Park.
2. Eumeces laticeps-Broad-headed Skink. Since this lizard has been collected in the following counties surrounding our area, Anne Arundel, Prince George's, Montgomery and Frederick Counties, it is possible in our area.

Squamata (Serpentes)

1. Storeria o. occipitamaculata-Northern Red-bellied Snake. This species should occur in Patapsco State Park. It is known only from one specimen in our immediate area, a specimen labeled "Catonsville, 1928", which was found in the collection of Baltimore City College by Dr. Remo Mansueti.
2. Elaphe g. guttata-Corn Snake. This snake has been collected in Anne Arundel, Prince George's, Montgomery and one specimen from Baltimore County, of which all surround our area. It therefore possibly occurs in the area in or near the state park.
3. Lampropeltis calligaster rhombomaculata-Mole Snake. A specimen of this snake has been collected in Anne Arundel County, N.W. of Friendship International Airport, within two miles of the southernmost end of Patapsco State Park. It may possibly turn up in the state park at some future date.

Chelonia

1. Pseudemys c. concinna-River cooter. Specimens of this animal have been found along the Patapsco River in flooded ponds, etc., southeast of Elkridge. Therefore it possible occurs within the lower Patapsco State Park. At this time it is not known whether or not this turtle is a feral or an indigenous form in Maryland.
2. Pseudemys f. floridana-Florida Cooter. This species has been collected in Anne Arundel County, but not yet in the Patapsco State Park area.

---Herbert S. Harris, Jr., 1049 Riverside Avenue, Baltimore, Md.
Department of Herpetology, Natural History Society of Maryland.

Case Reports of Two Dusky Pigmy Rattlesnake Bites
(*Sistrurus miliaris barbouri*)

A Dusky Pigmy Rattlesnake (*Sistrurus m. barbouri*) bite occurred October 16, 1960 at the Baltimore Zoo (Groves, 1965). A keeper was bitten on the third finger of his left hand, through a canvas glove. The snake, approximately 508 mm. in length, imbedded one fang in the keeper's finger. The head keeper at the zoo applied immediate first aid for snake bite. The fang puncture was cut deep and suction applied. He felt that most of the venom was expelled during this procedure. There was some immediate pain, but the victim complained that the first aid procedures hurt more than the bite. The bite occurred at about 2:00 PM and shortly afterwards the keeper was taken to Mercy Hospital for observation. After two hours he was released with no further treatment and returned to the zoo. He had only slight pain, even though his hand had swollen about one and a half times normal size. There was no discoloration or systemic symptoms.

The second Dusky Pigmy Rattlesnake bite occurred at 10:15 PM, Saturday, May 16, 1964. The victim was an adult male (74 inches, 165 lbs., 22 years old), and was in good health. The snake, a female, measured 430 mm. total length (385 mm. snout-vent length). The snake was pinned securely to the ground; the fangs could be seen hanging over the lower jaw. The collector proceeded to pick it up in the approved fashion, the fingers grasping the snake behind the head. The snake twisted and imbedded one fang below the first joint on the left index finger. A firmer grip was obtained and the snake was put in a collecting bag.

There was no immediate pain or swelling, but a large drop of blood oozed from the fang puncture. Within two minutes a tourniquet was applied below the knuckle and at 10:45 PM it was removed. At this time no pain or swelling was evident. The first swelling was noticed one hour after the bite occurred. It advanced up the finger, and by 11:30 PM had reached the knuckles.

At 11:45 PM the victim read the account of the Pigmy Rattlesnake bite reported by Schmidt and Inger (1957: 271-272) and decided as a precautionary measure to inject 10cc. of anti-venin intra-muscularly. Five cc. was injected into both sides of the upper arm, a short distance below the shoulder.

By Sunday morning, May 17th, his hand was slightly sore and the swelling had reached the wrist. The maximum swelling was reached about 3:00 PM, when the hand was about twice normal size. A reduction in the swelling behind the knuckles was apparent by 4:00 PM. To help retard the flow of venom an ice

pack was applied to the hand during the remainder of the night.

On Monday, May 18th, the hand was less swollen when he awoke and it continued to reduce in size during the day. The ice pack was applied periodically. At 5:00 PM, hives were noticed at the injection site of the antivenin. They irritated him the remainder of the night. They were probably due to the antivenin, although until this time he had no allergies to other horse serums.

Except for the bitten finger, all the swelling was gone by 3:00 PM Tuesday, May 19th. The hives had spread over the entire arm and continued to irritate the victim. When he retired for the night the finger was slightly swollen. Also the hand and finger were sore if rubbed.

Wednesday through Friday, May 20-22, the hives continued to irritate him. Various medications were applied, the best being petroleum jelly. During the early morning hours of May 22nd, the hives finally disappeared. The finger was very sensitive to the touch, and felt as though it was swollen.

On Tuesday, May 26, he again broke out in hives, this time over the complete body. Antihistamine tablets (chlorotrimeton) were taken, and within a day the hives were completely cleared up. About six months later the hives appeared again. This could possibly be an after effect, as he never had hives prior to the bite.

Remarks

The above cases have been presented in all available detail due to a paucity of published information concerning Pigmy Rattlesnake bites. There are usually a few people bitten by Pigmy Rattlesnakes (Sistrurus miliaris ssp.) each year and with all these bites recorded over the years there have been no reported deaths (Boys and Smith, 1959:59). In general, the Pigmy Rattlesnakes are considered the least poisonous of North American venomous snakes (Boys and Smith, 1959:58). I have seen many professional and amateur herpetologists, as well as collectors and naturalists, handle these snakes carelessly. Since the result of any poisonous snake bite is due to many factors, it must be remembered that the Pigmy Rattlesnake is venomous and must be given proper respect! The reader is referred to the account, published by Schmidt and Inger (Loc. cit.), of a man who was bitten by a small (approx. 229 mm.) Carolina Pigmy Rattlesnake (S. m. miliaris) and received no treatment. From such a small specimen the victim experienced extreme pain, discoloration and systemic symptoms, which were much stronger than in the bites reported in this note.

I believe there is no excuse for a poisonous snake bite, except carelessness on the part of the individual bitten. Even if there are no serious results from a venomous snake

bite, there is usually enough pain and discomfort that any carelessness, for "the sake of convenience", is not worth the risk.

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Department of Herpetology, Natural History Society of Maryland
and 1049 Riverside Avenue, Baltimore, Maryland.

----Herbert S. Harris, Jr., 1049 Riverside Avenue, Baltimore, Md.
Department of Herpetology, Natural History Society of Maryland.

An Abnormal Pattern in the Eastern Milk Snake,
Lampropeltis doliata triangulum (Lacepede).

On October 21, 1964, a male Eastern Milk Snake, Lampropeltis doliata triangulum (Lacepede), having an unusual dorsal pattern, was collected in a field near the corner of Putty Hill Road and Perring Parkway, Parkville, Baltimore County, Maryland (See Fig. 1). Instead of having the typical single dorsal blotches or saddles, this snake had groups of saddles fused to form short, irregular stripes. Scapulation was normal with 19-19-17 scale rows, 188 ventrals and 45 subcaudals. Total length of the snake was 210 mm. The length of the tail was 25 mm. approximately 1/8 of the total body length.

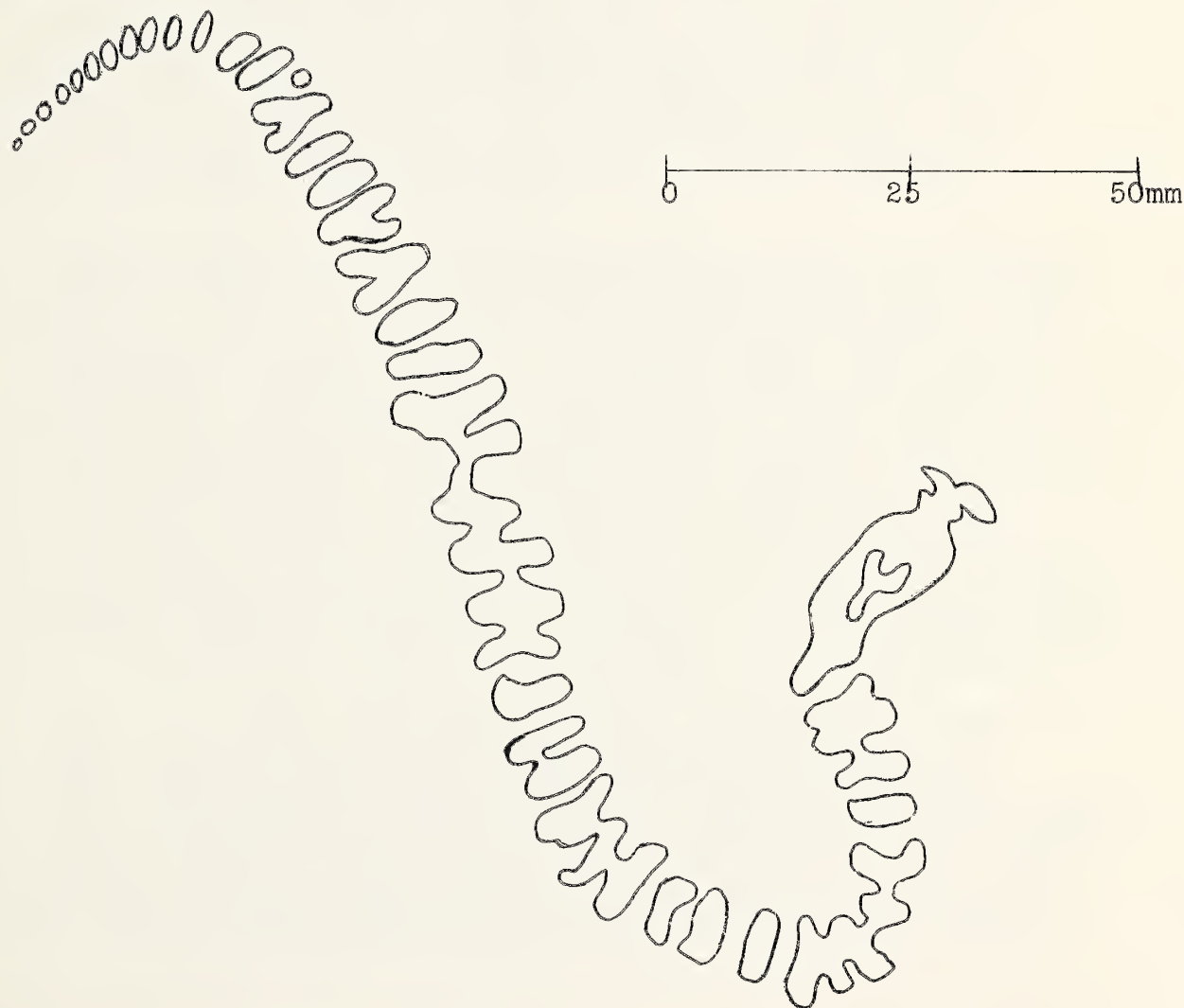


Fig. 1. - Lampropeltis doliata triangulum (Lacepede)
showing unusual pattern.

---L. Richard Franz, Jr., 3310 Beverly Road, Baltimore, Maryland 21214

The Hellbender (*Cryptobranchus alleganiensis*) in Maryland *

The hellbender, *Cryptobranchus alleganiensis* (Daudin), is the largest salamander in Maryland. In this species adult specimens average about 17 inches in length. Males vary from 11 to 22 inches, while females may reach a maximum length of about 27 inches (Bishop, 1943, p. 61).

The range of the hellbender includes the Susquehanna and its tributaries in New York, Pennsylvania, and Maryland; the Ohio and its tributaries including the Allegheny; the Mississippi River southward to Missouri, Arkansas, and Georgia. It has also been recorded from Iowa (Bishop, 1943, pp. 59-60).

In Maryland the hellbender has been recorded both in the eastern and the western part of the state. In the east it occurs in Cecil County in the Susquehanna River and in the shallow area near the head of Chesapeake Bay known as the Susquehanna Flats (Conant, 1945, p. 2). Fowler (1915, p. 38) also mentions it as occasional in the Susquehanna River and records it from the following localities in Cecil County: Conowingo, Octoraro, and Bald Friar.

In Western Maryland this salamander occurs only in Garrett County where it has been recorded from the Castleman and Youghiogheny Rivers. Both of these rivers are in the Ohio River drainage. Supporting its occurrence in the Castleman (Casselman) River, the American Museum of Natural History has two specimens (Nos. 51549-51550) collected from this river. These records were made available through the courtesy of Mr. Charles M. Bogert. In the Youghiogheny River, McCauley and East (1940, p. 121), while seeing no specimens, report that it is caught on hook and line by fishermen. Moreover, natives with whom the writer talked were familiar with this creature in the same river under the colloquial name of "alligator". There are, however, apparently no specimens extant from the Youghiogheny. It is therefore of interest to record the capture of a specimen from this river.

On April 13, 1946 the writer secured a specimen of this species from the Youghiogheny River between Selbysport and Geices. The river at this point is quite shallow and swift and is full of boulders of various sizes. The specimen was taken in the early afternoon from a quiet pool between the shore and a small island about 6 feet offshore in water about 2 feet deep. When first seen it was lying with its head between two rocks. Just prior to being seized it began to crawl slowly across the

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silty bottom. Upon being grasped behind the head and lifted from the water, it opened a cavernous mouth and squirmed vigorously exuding a viscous white slime from its skin.

It was brought back alive to the laboratory and put in a large tank in about 6 inches of water. Two days after being placed in this tank it was offered earthworms as food. These it voraciously accepted swallowing each in almost a single gulp. In the quiet water of the tank it occasionally rocks from side to side aerating the conspicuous lateral folds of its body which serve as accessory respiratory devices. In addition it comes to the surface from time to time and fills its lungs with air at which time bubbles frequently escape from its mouth. At this writing the specimen has been in captivity for about a month and is apparently thriving. The only unfavorable condition that has been noted in the specimen is the presence of parasitic worms. Thus on three different occasions it has passed a number of tapeworm proglottids, while on another occasion a long slender roundworm was removed as it emerged from the subcutaneous tissues of its hind foot.

It is hoped that the publication of this brief account will stimulate further interest in this most interesting Maryland amphibian. Thus observations on its breeding habits in the state are especially desirable as well as more complete data on its distribution. In this latter connection it is possible that the hellbender may ultimately be found in the Potomac River drainage. The Potomac and its headwater tributaries with their higher gradients are thus encroaching upon those of the Youghiogheny to the westward. This is particularly the case along the Savage-Youghiogheny divide which once stood along the Great Backbone-Big Savage crest but which is now on its way to a new resting place upon the Meadow Mountain-Roman Nose range (Abbe, 1902, pp. 53-54).

In closing it seems pertinent to mention the fact that the entire area along the Youghiogheny River from Friendsville, Maryland to Confluence, Pennsylvania traversed on this trip is soon to be inundated in connection with a flood control dam now under construction. It is therefore hoped that those interested in herpetology and other phases of natural history will endeavor to visit the area for the purpose of securing representative material while it is still possible to do so.

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----James A. Fowler.

Ed. note: Since the original publication of this paper, the range of the hellbender has changed, due to more collecting. The range of the hellbender (Cryptobranchus a. alleganiensis) now includes the Susquehanna and its tributaries in southern New York, Pennsylvania, and Maryland; the Ohio and its tributaries including the Allegheny; the Mississippi River southward to central Missouri, northern Alabama and northern Georgia. The subspecies C. a. bishopi is found in the Black River system of southeast Missouri and adjacent Arkansas. Dr. James A. Fowler is presently Director of Education at the Henry Ford Museum and Greenfield Village, Dearborn, Michigan.

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Herbert S. Harris, Jr. - Advisor and Editor
James G. Kimos - Editor

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The Cover: A male Bufo woodhousei fowleri calling, photo
by Dr. R. S. Simmons.

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Some Records for Clemmys muhlenbergi in Cecil County, Maryland

In Maryland, the Bog Turtle, Clemmys muhlenbergi has been recorded from three counties: Baltimore, Harford, and Cecil. The observations following were made in Cecil County, near Conowingo Dam during 1965 and 1966. The general region consisted of a series of ponds, soggy grass areas, and small trickles, all of which were in wooded areas. Turtles were observed in two locations; one a small swampish pond and the other a soggy grass area at the edge of one of the larger ponds. Specimens were recorded at either or both locations on the following dates.

April 17, 1965: A male 94mm. in length was seen on a clump of sphagnum near the edge of the larger pond. The ground was soggy but there was not any water immediately around the turtle. Air temperature was about 60°F.

April 18, 1965: Another male (Fig. 1&2) was seen at the edge of a small hole containing water in a soggy grass area. It was the largest specimen recorded, having a carapace length of 106mm.

April 22, 1965: Three turtles were observed. The first was seen at 12:15 p.m. in a wet grassy area. The specimen was a female, 90mm. in length, and was crawling along in a small trickle of water. The second turtle was sighted at 12:55 p.m. about a mile from where the first bog turtle was located. This specimen was a male, 97mm. in length, and was found half way down a hole. The third turtle was seen swimming in a small pond nearby at 1:07 p.m. When approached, the turtle swam beneath a branch on the bottom of the pond. It was a male, 100mm. in length.

April 29, 1965: A male 96mm. in length was observed sunning in a damp grassy area at 11:50 a.m. A female 87mm. in length was observed nearby at 11:55 a.m.

May 3, 1965: Two specimens were observed sunning near each other at 10:15 a.m. on grass mounds at the edge of a larger pond. One was a male 94mm. in length and the other was a female 95mm. in length.

May 13, 1965: A female 92mm. in length was observed in a damp grassy area. The specimen had part of one hind foot missing.

June 5, 1965: Two turtles were found sunning next to each other in the grass at the edge of the smaller pond. Both were females, one 89mm. and the other 60mm. The latter turtle was the smallest specimen seen in the wild.

August, 1965: By late summer all of the ponds were completely dry. An empty shell was found at the smaller pond but no live turtles were seen.

Two hatchling bog turtles measured were 23mm. and 25mm. They hatched on August 1, 1965 from eggs laid on June 9; an incubation period of 53 days. April 17, 1966: A male, 93mm. in length was found at 2:50 p.m. at the edge of a small puddle. Observation was made near the larger pond in a soggy grass area. The air temperature was 68°F. and water temperature 53°F. May 15, 1966: A male, 98mm. in length was collected at 4:00 p.m. while sunning in a small puddle in a soggy grass area. Air temperature was 76°F. Ken Nemuras, Route #4, Box 51A, Pasadena, Maryland.



Fig. 1. Clemmys muhlenbergi
Observed 18 April 1965 in
its habitat while sunning
at the edge of a hole.



Fig. 2. Close up of the
same turtle. When found
sunning, these turtles
usually make no attempt
to escape.

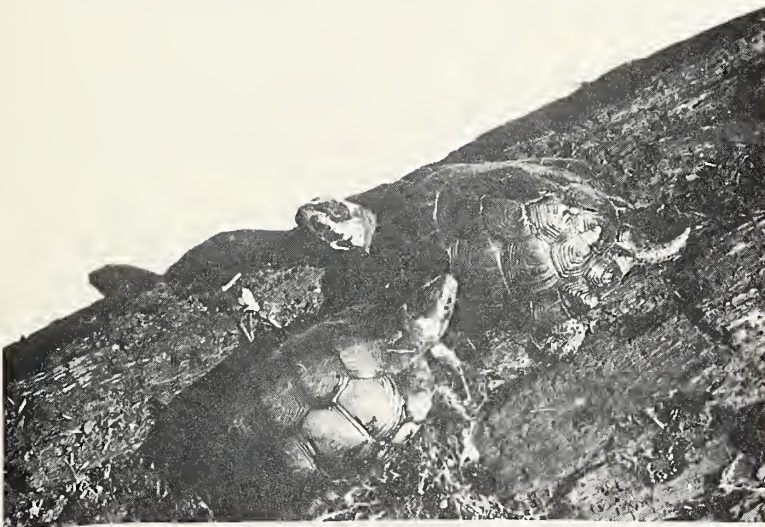


Fig. 3. Two C. muhlenbergi
observed during April 1965.
The shell pattern and neck
blotches can be seen here.

New County Records from Maryland's Eastern Shore

Of Maryland's 23 counties and the District of Columbia, Somerset and Caroline Counties have the least number of recorded reptiles, with 16 species and subspecies each. Somerset County has the least number of amphibians with only 9 recorded.

On April 24, 1966, Herb Harris, Jr., Tom Sparhawk and myself made a trip to the Eastern Shore. We planned to collect in Somerset County in an effort to establish records for certain species and subspecies which we knew should be there.

Our first specimens were collected in Wicomico County southeast of the Nanticoke River on U. S. Rt. 50. These were a couple of Eastern Mud Turtles, Kinosternon s. subrubrum which were found along the side of the highway. One individual was 84mm. in length and 68mm. in width while the other turtle was 80mm. by 62mm.

In Somerset County between 10:00 and 11:00 a.m. we explored a wooded area east of Widgeon along Md. Rt. 362. Specimens collected were a Black Rat Snake, Elaphe o. obsoleta and a Red-backed Salamander, Plethodon c. cinereus. A Five-lined Skink, Eumeces fasciatus was seen but not captured. The air temperature at this time was 77 degrees Fahrenheit.

At 11:20a.m. we stopped at a marsh, also along Md. Rt. 362, and collected an Eastern Painted Turtle, Chrysemys p. picta. The specimen was 140mm. in length and 100mm. in width.

Our next stop was at 11:30 a.m. at Widgeon. In a stream flowing under the highway (Md. Rt. 362) we collected a Southern Leopard Frog (Rana pipiens sphenocephala), Fowler's Toad (Bufo woodhousei fowleri), 2 Bullfrogs (Rana catesbeiana) and a baby Eastern Painted Turtle 25mm. by 24mm.

Shortly afterwards on Md. Rt. 363 west of St. Stephen, a Common Snapping Turtle, Chelydra s. serpentina was found crossing the road. The specimen was 91mm. in length and 77mm. in width.

A total of 5 Red-backed Salamanders were then collected in an area east of Monie off Md. Rt. 363. Also seen were 2 Ground Skinks, Lygosoma laterale. The air temperature was 79-81°F.

At 1:35 p.m. a DOR Eastern King Snake, Lampropeltis g. getulus was seen along a side road off Md. Rt. 363 on the way to Champ.

In some ponds about 0.5 miles northwest of Hopewell on

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A total of 5 Red-backed Salamanders were then collected in an area east of Monie off Md. Rt. 363. Also seen were 2 Ground Skinks, Lygosoma laterale. The air temperature was 79-81°F.

At 1:35 p.m. a DOR Eastern King Snake, Lampropeltis g. getulus was seen along a side road off Md. Rt. 363 on the way to Champ.

In some ponds about 0.5 miles northwest of Hopewell on

Md. Rt. 413 a number of Eastern Painted Turtles were seen, of which 3 were caught. These were 105mm. by 80mm., 105mm. by 82mm., and 51mm. by 50mm. respectively. They were taken between 2:45 and 3:00 p.m. The air temperature was 83°F. and the water temperature 77°F.

At 3:25 p.m. a Northern Watersnake, Natrix s. sipedon was found swimming in a roadside ditch along Md. Rt. 358 about 2 miles east of Crisfield.

A young Natrix was taken at 3:45 p.m. along the edge of a pond on Md. Rt. 413 below Marion.

Between 4:30 and 5:00 p.m., several specimens were found along a portion of the Pocomoke River on Md. Rt. 667 near Rehoboth. These included a Fowler's Toad, Eastern Mud Turtle 95mm. by 72mm., an Eastern Painted Turtle 142mm. by 109mm., and a Common Snapping Turtle 120mm. by 93mm. Another larger Snapping Turtle was observed partly buried in the mud near the river in a soggy wooded area.

Between 5:30 and 6:00 p.m. a Common Snapper, Northern Watersnake and Northern Cricket Frog, Acris c. crepitans were found in a marshy area off Md. Rt. 13 northwest of Pocomoke City.

Larvae of the Marbled Salamander, Ambystoma opacum was collected in a woodland pond off Md. Rt. 363 east of Monie during the evening hours.

In a swampy area in Worcester County six species and subspecies of frogs and toads were found while collecting at night. These included a Fowler's Toad and the Northern Cricket Frog, previously collected in Somerset County, as well as the Spring Peeper (Hyla c. crucifer), New Jersey Chorus Frog (Pseudacris triseriata kalmi), Green Frog (Rana clamitans melanota), and Wood Frog (Rana s. sylvatica).

As a result of the field trip to Maryland's Eastern Shore, the following six new county records were established:

Wicomico County

1. Eastern Mud Turtle-Kinosternon s. subrubrum

Somerset County

1. Eastern Mud Turtle-Kinosternon s. subrubrum
2. Eastern Painted Turtle-Chrysemys p. picta
3. Common Snapping Turtle-Chelydra s. serpentina
4. Red-backed Salamander-Plethodon c. cinereus
5. Marbled Salamander-Ambystoma opacum

Ken Nemuras, Tom Sparhawk and Herbert S. Harris, Jr., Dept. Herpetology, Natural History Society Md., 2643 N. Charles Street, Baltimore, Maryland 21218.

Field Notes and a New County Record

Although the Snapping Turtle, Chelydra s. serpentina has probably been found in every county in Maryland, previous records were lacking from the counties of Somerset and Caroline on the Eastern Shore. However a specimen was found in Somerset County on April 24, 1966, thus leaving Caroline as the only county needed to complete the state range of C. s. serpentina. As this turtle has been recorded from the surrounding counties of Queen Anne's to the north, Dorchester to the south, and Talbot to the west, it came as no surprise to find a specimen in Caroline County on May 1, 1966. An account of this and other observations made on the May 1 field trip follows.

Our first reptile was taken at 1:35 p.m. in Queen Anne's County. It was a Spotted Turtle, Clemmys guttata 106mm. in length and 83mm. in width. The turtle, a male, was found AOR on U. S. Rts. 50/301, 0.7 miles west of the Grasonville junction.

An Eastern Painted Turtle, Chrysemys p. picta was seen DOR on Md. Rt. 404 in Talbot County, 1.4 miles west of Church Lane.

In Caroline County along alternate Md. Rt. 404 we stopped at a small pond one mile east of Hillsboro. A couple of turtles were seen sunning on branches but ~~dove~~ into the water as we approached. One, a female Spotted Turtle 101mm. by 80mm., was picked up after it had started swimming towards the surface. The C. guttata was found at 2:05 p.m. and the C. s. serpentina was picked up on the bottom of the pond at 2:10 p.m., completing the only missing county record for this species.

An Eastern Hognose Snake, Heterodon platyrhinos was picked up AOR at 2:25 p.m. 1.8 miles south on Log Cabin Road off Md. Rt. 404.

A Bullfrog, Rana catesbeiana and a couple of Eastern Painted Turtles, were seen off Md. Rt. 16 between 3:30 and 4:00 p.m. A Five-lined Skink, Eumeces fasciatus was taken 0.8 miles north of Wilkins Br. Rd.

An Eastern Painted Turtle, 108mm. by 86mm., was found AOR at 4:20 p.m. on Md. Rt. 16, one mile east of Preston.

Leaving Caroline County for a short time, we saw an Eastern Mud Turtle, Kinosternon s. subrubrum at 4:30 p.m. DOR near Williamsburg in Dorchester County.

Back in Caroline County another Five-lined Skink was

caught and a Northern Fence Lizard, Sceloporus undulatus
hyacinthinus was seen at 5:15 p.m. near Smithville.

Final observations of the day were made on the Western Shore in Anne Arundel County. An Eastern Mud Turtle 100mm. by 76mm. was found at 7:15 p.m. in a dried up pond site near the junction of Solley Road and Mountain Road in Pasadena. A young Eastern King Snake, Lampropeltis g. getulus was found under a board at 7:20 p.m. in the same area. At 8:00 p.m. a Green Frog, Rana clamitans melanota was observed off Md. Rt. 2 north of Glen Burnie, while Fowler's Toads, Bufo woodhousei fowleri and Spring Peepers, Hyla c. crucifer were heard calling.

Record established:

Caroline County

1. Common Snapping Turtle-Chelydra s. serpentina

Ken Nemuras and Herbert S. Harris, Jr., Dept. Herpetology,
Natural History Society Md., 2643 N. Charles Street, Baltimore,
Maryland 21218.

Editor's Note:

Since the publication of the "Distributional Survey: Maryland and the District of Columbia" in Vol.1, No.1 of The Bulletin, many new county records have been received. Some of these may appear periodically in various papers published in our bulletin. However, at the end of each year all new "county records" received during the year will be published together in "Additions to the Distributional Survey: Maryland and D. C.". These additions will be numbered...Addition No. I, etc. At the end of approximately four years the Distributional Survey will be reprinted with all the additions added. This same pattern will be followed in the future.

Red Leg in a Natural Population of Maryland Amphibians

A bacterial disease, commonly called "Red Leg," was discovered in a natural population of amphibians at the Priest Bridge sand and gravel pits, 3/4 miles north of the Patuxent River along U. S. Route 301, Anne Arundel County, Maryland. This area, which has been a favorite collecting spot of Maryland herpetologists for 20 years, contains several dozen spring-fed ponds. Large populations of amphibians carry on their reproductive cycles in or along the margins of these pools. For the last five or six years this area has been used by the local inhabitants for dumping of trash, thus polluting many of these ponds. During the late summer and fall months, the ponds are usually reduced in size with many completely drying up.

In August, 1961, large numbers of amphibians were found concentrated in a few remaining ponds. The water level was extremely low and there was much trash and garbage in the ponds. On this occasion, the disease "Red Leg" was found infecting both frogs and tadpoles. Every Rana clamitans (Green Frog), Rana catesbeiana (Bullfrog) and Rana pipiens (Leopard Frog) examined was found to be diseased.

This disease is easily recognized by the large reddish areas on the hind legs and the lower abdomen caused by the hemorrhaging of the capillaries. Eventually the disease will affect all the organ systems of the animal and will cause death. Although this infection may be found readily in laboratory animals, apparently it is relatively rare in natural populations. Hunsaker and Potter (1960, *Herpetologica*, Vol. 16: 285-86) reports that a natural population of Eurycea neotenes, Rana pipiens and Acris crepitans from San Antonio, Texas was infected with the disease. The diseased animals appeared in this population after they were forced to congregate in a drying up stream. Apparently this infection will show up when a large group of animals are confined in a small area without proper circulation of water.

L. Richard Franz, Jr., 3310 Beverly Road, Baltimore, Maryland 21214

Collecting Notes from Frederick County, Maryland,
with Two New County Records

On Saturday, April 9, 1966, at 5:30 p.m., William Roeder, David Saul and ourselves circumvented a pond approximately 3 miles south of Thurmont, Frederick County, Maryland for the purpose of collecting amphibians, especially salamanders. The day had been one of intermittent rain and snow flurries. The air temperature was about 3°C. Near a spring that fed into a small pond, two Dusky Salamanders, Desmognathus f. fuscus, and a Two-lined Salamander, Eurycea b. bislineata, were collected under several rocks at the water's edge. An adult Red Salamander, Pseudotriton r. ruber, was found nearby in a similar situation. Further searching along an adjacent stream produced five more Desmognathus and a Red-backed Salamander, Plethodon c. cinereus.

In the pond, several egg clusters were seen. One near hatching and another in the process of hatching, were believed to be those of the Jefferson Salamander, Ambystoma jeffersonianum. (See ed. note) A third cluster was observed to be that of the Wood Frog, Rana s. sylvatica. This last one was almost completely dissipated with only four larval forms still encased. Six additional masses from undetermined species were seen but not taken.

Collecting was resumed several hundred yards away in a second pond just as it began to rain again. Almost immediately, a large Ambystoma jeffersonianum was collected under a rock approximately six feet up the bank from the water's edge by the junior author. The specimen, a male, measured 181 mm. Its snout-length was 82.5 mm. Less than ten feet away an adult female Spotted Salamander, Ambystoma maculatum, of average proportions was taken. An egg mass seen in this pond was believed to be that of A. maculatum.

Later in the day, between 8:00 p.m. and 10:30 p.m., seven Spring Peepers, Hyla c. crucifer, were caught in the original pond by the authors. All were at the edge of the pond and in the water. Two were in amplexus and the rest were vocalizing males. Twelve inches from the pond's edge and at a depth of three inches, the water's temperature which had dropped slightly was about 2°C.

The A. jeffersonianum and the H. c. crucifer represent new county records for Frederick County. Ambystoma jeffersonianum has only been collected in three of the four sections in the Appalachian Province. Previous records had placed it on the eastern edge of the Alleghany Plateau and in the Valley and Ridge section. The record of A. jeffersonianum reported here, extends the known range of the salamander approximately

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29 air miles eastward to the eastern edge of the Blue Ridge section. Specimens are unknown from the Great Valley section, which is located between the Valley and Ridge and the Blue Ridge sections. Further collecting should turn up the salamander in the intervening regions and possibly farther east into the Western Division of the Piedmont Province.

Two H. c. crucifer have been donated to the collection of the Department of Herpetology, Natural History Society of Maryland and subsequent collections of A. jeffersonianum larvae from the above mentioned ponds have been given to Herbert S. Harris, Jr. for study and preservation. The original specimens have been retained in the collection of the Jungleland Serpenterium.

Conant's "Field Guide to the Reptiles and Amphibians" and Bishop's "Handbook of Salamanders" were utilized for the identification of individuals and egg masses and for the determination of the relative sizes.

Richard A. Hahn and Peter S. Goodwin, Jungleland Serpenterium, Box 75, Thurmont, Maryland and Maryland Herpetological Society, 2643 North Charles Street, Baltimore, Maryland 21218.

Ed. note: Of the egg masses found April 9, 1966, one mass was brought to me the next day by William Roeder and David Saul. The larvae were in the process of hatching and were definitely those of A. jeffersonianum.

The Scarlet Snake (*Cemophora coccinea*) in Maryland *

John E. Cooper

During the lengthy span of years from 1862 to 1948, there have been only nine authentic records for the scarlet snake, *Cemophora coccinea* (Blumenbach) from Maryland and the District of Columbia vicinity. Six of these have been considered in previous papers, with Fowler (1945, pp.89-90) presenting a resume of available, authentic records for the species from Baltimore City and Anne Arundel, Prince George's, and Wicomico Counties.

In addition to the other records listed, Fowler (lit. cit.) states, "This snake has also been reported from Severn, Anne Arundel County, and St. Denis, Baltimore County, by Kelly, Davis, and Robertson (1936, p.68)." However, since no specimen exists for either of these locality records, it is the author's opinion that they should be considered invalid. The many diverse forms presented by intergradation of the milksnakes, *Lampropeltis dolia* *triangulum* and *Lampropeltis d. temporalis*, are sufficiently different from typical individuals to be confused with *Cemophora* and such specimens, as McCauley (1945, pp.101-102) suggests, may have been the basis for the two records here considered invalid.

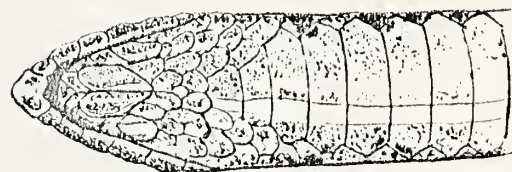
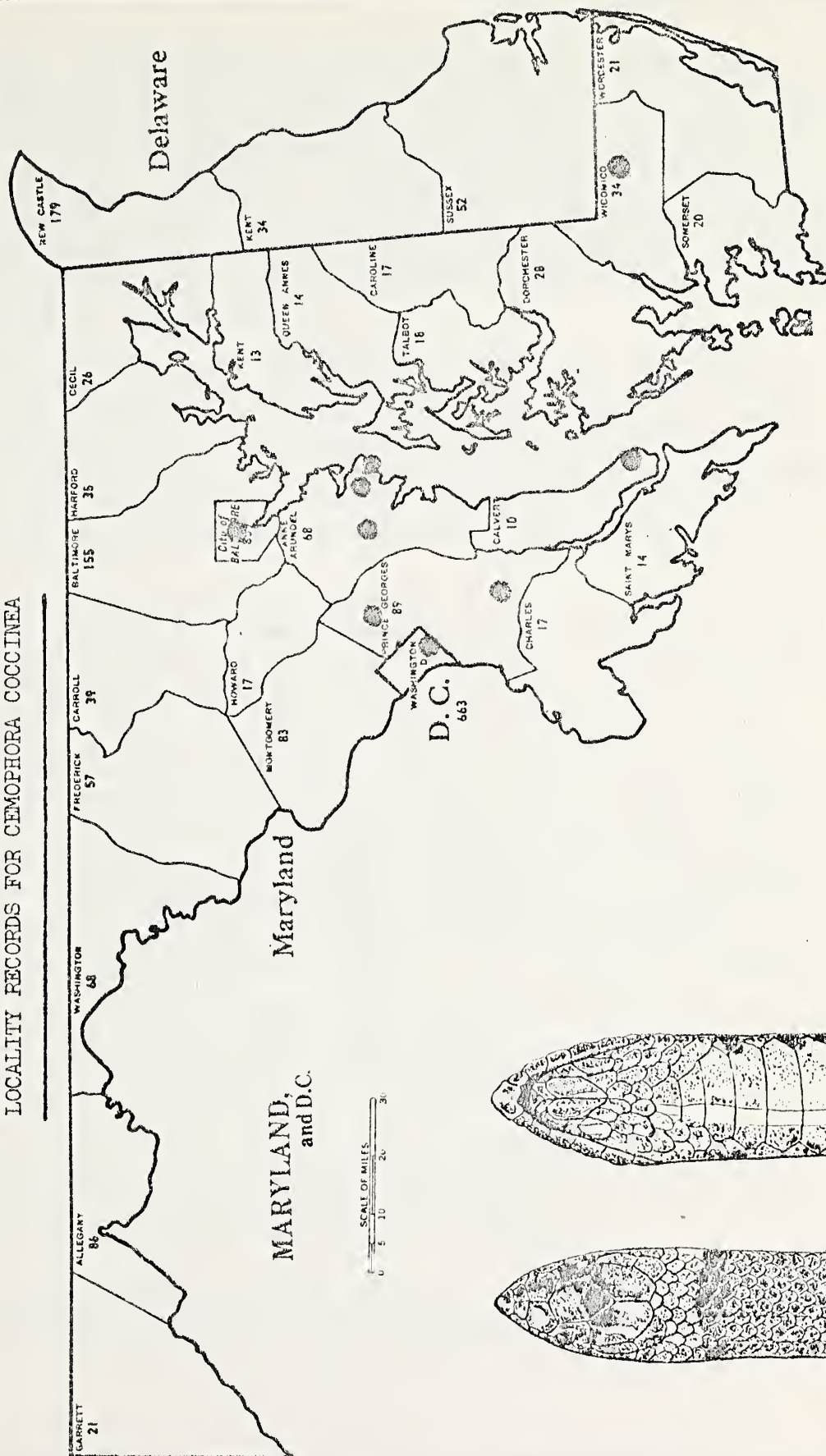
Concerning the specimen collected by Professor Wyatt at Baltimore, lit. cit., no other *Cemophora* have been recorded from in or around the Baltimore region, and since the character of this region is primarily Piedmont, the snake's further occurrence here seems highly improbable. Probably, the specimen in question was collected in or near the South Baltimore suburbs since this locality is near the Coastal Plain region of the state, where the species would be expected.

Subsequent to the publication of Fowler's article, three additional scarlet snakes have come to light. Of these three specimens, one is from Calvert County and represents a new county record, and the other two are additional records for Anne Arundel County. The Calvert County specimen was discovered dead on the road by the writer on July 7, 1946 at Cove Point. This individual was approximately eighteen inches long and the dorsal blotches numbered nineteen. The general area was Coastal Plain, being a large, sandy beach, with an occasional patch of shrubbery or small grove of pine trees. The area was level and a fairly large pine woods was present about 150 yards from the Chesapeake Bay front. Dwellings were directly adjacent to the spot where the snake was found. In the eastern sector of the beach there was a moderate-sized cattail pond in and around which various species of amphibians were found. Among these were

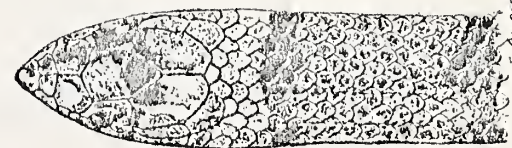
*Reprinted from the Maryland Naturalist, Vol.XX, No.4 1950, with the author's permission.



LOCALITY RECORDS FOR CEMOPHORA COCCINEA



AFTER ENZENGACHEN
(IN PART)



J. E. CAMPBELL '52

Rana pipiens sphenoccephala, Rana clamitans melanota, Rana catesbeiana, and Hyla c. cinerea X evittata (Dunn, 1937, pp. 9-10). Other species of reptiles and amphibians from the Cove Point area include Cnemidophorus sexlineatus, Lygosoma laterale, Eumeces fasciatus, Sceloporus undulatus hyacinthinus, Eumeces laticeps, Coluber c. constrictor, Lampropeltis g. getulus, Thamnophis s. sirtalis, Haldea v. valeriae, Storeria d. dekayi, Storeria o. occipitomaculata, Carphophis a. amoenus, Ambystoma opacum, Ambystoma maculatum, Pseudotriton r. ruber, Gastrophryne c. carolinensis.

No food records for Cemophora in Maryland are available, but three kinds of mammals have been found at Cove Point which constitute possible food items. The first, Cryptotis parva, is represented by a single specimen found under a board near the lighthouse on the Point. The second species, Zapus hudsonius, is recorded also on the basis of one specimen, whereas the third, Peromyscus leucopus noveboracensis, is a more abundant species.

Of the two additional specimens from Anne Arundel County, the first, (NHSM-R 716), was found by M. F. Groves and the writer, dead on the road on U. S. route #301 approximately $\frac{1}{2}$ mile northeast of Priest's Bridge. This individual was discovered on August 3, 1946. The area was again in the Coastal Plain and the road lay between two woods composed mostly of deciduous trees with numerous intermingled pines. The soil was sandy and the surface was level. Other species recorded from this area were Carphophis a. amoenus, Storeria o. occipitomaculata, Cnemidophorus sexlineatus, Eumeces fasciatus, Pseudotriton r. ruber, Pseudotriton m. montanus, Notophthalmus v. viridescens, Bufo woodhousei fowleri, and Scaphiopus h. holbrookii. Also recorded were Coluber c. constrictor, Lampropeltis g. getulus, and Netrix s. sipedon.

The second Anne Arundel County specimen was collected on June 8, 1947, at Mill Creek, near Arnold, by Philip A. Butler. This specimen, for which no collecting data are available, is contained in the collection of the University of Maryland.

The scarlet snake should also be expected in Charles and St. Mary's Counties in Southern Maryland whence have come reports of "coral snakes" and on the Eastern Shore with the exception of northern Cecil County (Piedmont).

The writer wishes to express his appreciation to Mr. James A. Fowler, Director of Education, Academy of Natural Sciences of Philadelphia, for his suggestions and criticisms.

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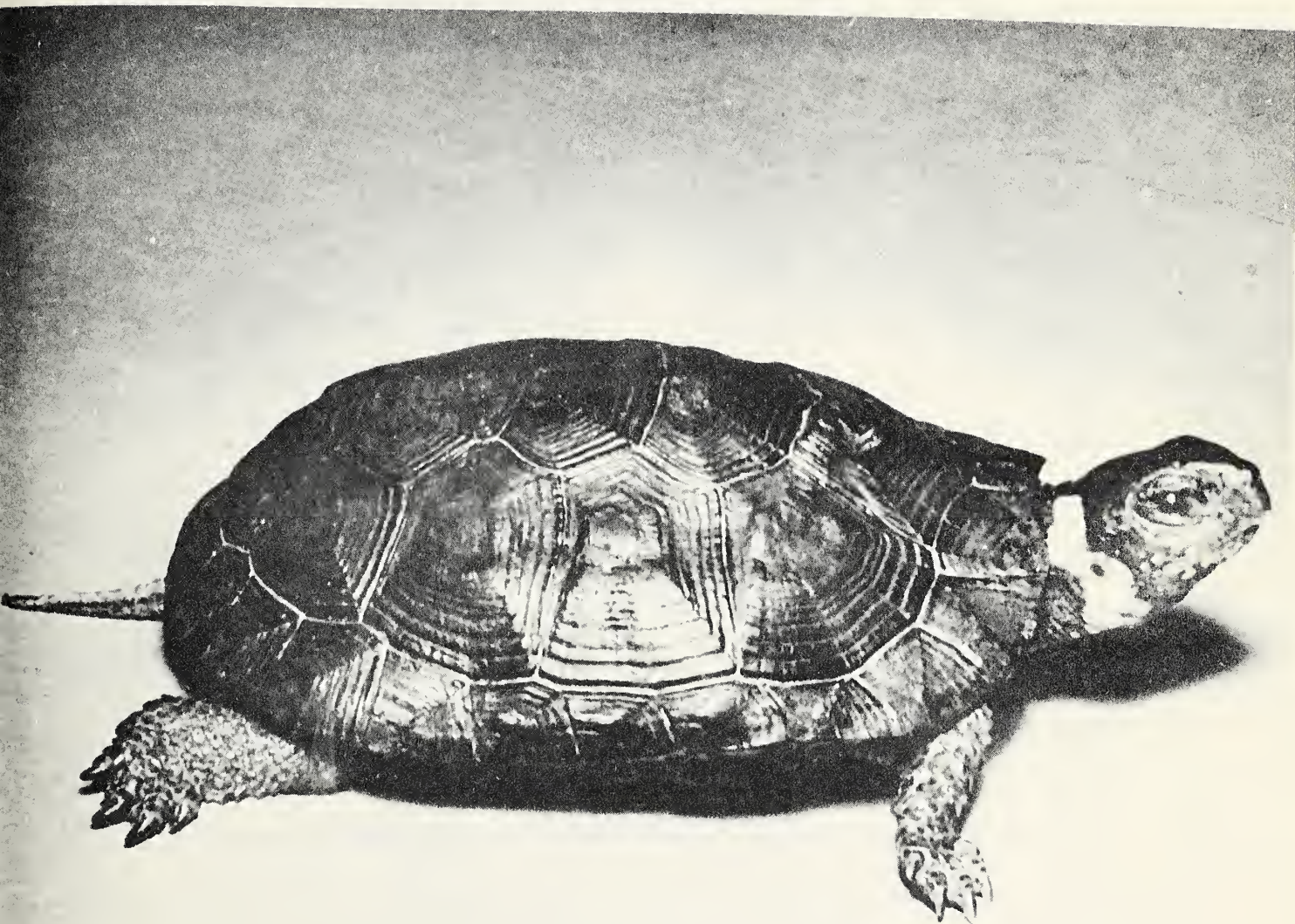
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MARYLAND HERPETOLOGICAL SOCIETY



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Department of Herpetology, Natural History Society of Maryland

Herbert S. Harris, Jr. - Advisor and Editor

James G. Kimos - Editor

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30 September 1966

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The Cover: Clemmys muhlenbergi. The light areas on the neck
are actually orange blotches. This specimen is
from near Monkton, Maryland. Photo by Dr. R. S.
Simmons.

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Ed. note: Manuscripts being submitted for publication should be type written (double spaced) on good quality 8½ by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by author. Reprints are available at \$0.01 a page (\$0.02 a page with photographs) and should be ordered when manuscripts are sent in.

It should be mentioned that the article "The Scarlet Snake (Cemophora coccinea) in Maryland" which appeared in our last bulletin (Bull Md. Herp. Soc. 2 (2): 10-14) is up to date. No other specimens have been collected since its original publication.

Errata

Snakes of Maryland by Howard A. Kelly, Audrey W. Davis and H. C. Robertson. Natural History Society of Maryland, Baltimore, 1936.

<u>Page</u>	<u>Comment</u>
9 (Contents)	Delete: Gray Rat Snake (Blotched Chicken Snake), Yellow Rat Snake (Striped Chicken Snake), Red Milk Snake, Striped Water Snake, Water Pilot, Spotted Garter Snake.
25 (map)	Delete: (9) Gray (sic) Rat, (10) Yellow Rat, (17) Striped Water, and all locality records for same.
26, 27 (Key)	Delete: Gray Rat, Red Milksnake, Blotched Garter, Striped Water, Water Pilot.
28	Delete: Yellow Rat.
30	<u>Carphophis amoena</u> should be a trinomial; Blanchard described subspecies in 1924. Also, <u>Carphophis</u> is abundant in the Coastal Plain, becoming less common in the Piedmont and further west, and decidedly rare on the Alleghany Plateau.
31	The venter of the snake illustrated is quite atypical of <u>Diadophis punctatus edwardsi</u> , which usually has an unmarked venter, or a few small central spots. The dorsum is typical of this subspecies in Maryland.
32	"Some have two rows of black dots on the abdomen..." No specimens of <u>edwardsi</u> have been seen with two rows of black dots on the venter, a condition which characterizes the distant southern subspecies <u>stictogenys</u> . The members of the Eastern Shore (Outer Coastal Plain) population, currently diagnosed as intermediate between <u>p. punctatus</u> and <u>p. edwardsi</u> , may have a row of spots on the venter, but seldom more than a single row.
35	Color variations in <u>Heterodon</u> are not, or at least have not been demonstrated to be, clearly correlative with geographic distribution. The totally melanistic variety is seldom seen in Maryland, although specimens with more dark pigment than usual are not uncommon.
38	Unlikely records: Lusby, Calvert County, is far out of the range of this upland form; Relay and Druid Hill Park, while plausible, should be deleted here.

Errata (Cont'd)

- 38 (cont'd) The stated Range is largely incorrect.
- 41 The snake illustrated is Natrix septemvittata, not Opheodrys.
Unlikely records: This snake is unknown from the Alleghany Plateau, thus records for Garrett County are erroneous. It has never been authentically recorded from Allegany County, either.
- 43 "This coluber lives much in the trees where it is seen basking in the sun." Few, if any, racers have been found in trees in Maryland.
- 44 It is quite surprising that "The stomach contents of thirty-five specimens were examined..." and only mammals and a few birds were found. Coluber is notably ophiophagous, and even cannibalistic, in Maryland. Also, the authors contend that this species lays its eggs under stones or logs, whereas they are actually laid in logs, soil, or sawdust piles. Also, despite the statement that "it is not so common now as the mountain blacksnake" this species is actually much more abundant than Elaphe o. obsoleta, especially in the Coastal Plain.
- 47 The species name "Guttata" should not be capitalized; the illustration is atypical of Maryland's relatively dark corn snakes.
- 49 "...young bearing the markings of the parent." Blotch coloration of young guttata in Maryland is dark and obsoleta-like for the first year, showing only a little red coloration.
- 50 Maryland is not, of course, the northern-most boundary for guttata, the snake being found into New Jersey. Unlikely records: This snake is almost exclusively Coastal Plain in distribution in Maryland, therefore Harford and Howard County records are doubtful, especially the latter. Part of Harford County is, however, in the Coastal Plain.
- 52 The range of Elaphe o. obsoleta is erroneous.
- 53 through 57 These snakes are not indigenous to Maryland; their inclusion in this book is hard to understand.
- 58 The record for a Pituophis melanoleucus "taken near Centerville, Queen Anne's (sic) County" is completely unsubstantiated and should be completely disregarded. As for the other "records" for this species, the term "Southern Maryland"

Errata (Cont'd)

- 58 (cont'd) refers to the lower group of counties in the Inner Coastal Plain (Anne Arundel, Prince George's, Charles, Calvert and St. Mary's) where the presence of this snake has never been hinted. Dr. R. V. Truitt's Worcester County specimen has never been verified. This snake is probably not part of the Maryland fauna.
- 62 The stated range of Lampropeltis g. getulus is erroneous. Unlikely records: Swanton, Garrett County, is far out of the range of this largely Coastal Plain form.
- 64 Unlikely records: Woodstock, Baltimore County, and Roland Park, Baltimore, should be discounted.
- 65 The two Maryland milk snakes are the subspecies triangulum and temporalis, and these intergrade over a large area in the state. The upper illustration, except for the very light ground color, could be an upland triangulum, which have dark blotches (as adults); the bottom could represent an intergrade (as evidenced by the deterioration of the neck "Y"). It is not temporalis. The subspecies amaura is not found anywhere near Maryland.
- 67 Discount the discussion of amaura.
- 68 The St. Denis, Baltimore County, record for Cemophora should be discounted. The range includes New Jersey.
- 69 It should be pointed out that the snakes in the two lower illustrations are not found in Maryland.
- 71 Discount the discussion of rigida.
- 73 Natrix septemvittata feeds primarily on crayfish, but this food is not mentioned. This snake is not found "in every county", being absent from the southern Coastal Plain and most of the Eastern Shore.
- 75 The snake illustrated is not typical sipedon, in which the latter group of dorsal blotches does not extend to the venter but separates from the lateral segment to form relatively distinct quadrate dorsal blotches and separate lateral blotches. There is immense variation in ventral coloration.
- 77, 78 Discount the discussion of taxispilota.
- 80 In the discussion of the young of Storeria d. dekayi, no mention is made of their prominent

Errata (Cont'd)

- 80 (cont'd) neck ring.
In the discussion of occipitomaculata, "No variation of color has been noted." Most Coastal Plain specimens are pale tan or reddish dorsally, as opposed to the dark coloration of more upland specimens. This species is not most abundant in "Calvert and St. Mary's Counties" but is most abundant on the Alleghany Plateau where it is one of the common snakes. By contrast, it has proven hard to find in the Coastal Plain.
- 81 The range of Virginia valeriae is not complete.
- 82, 83 Thamnophis sauritus should be a trinomial since subspecies were known then.
- 85 Although T. s. sirtalis is a variable species in Maryland, none has been seen approximating this illustration !
- 88 Discount this discussion.
- 90 The scientific name of the copperhead should be trinomial.
- 92 Although the copperhead's range probably encompasses the entire state, it is yet unrecorded from most of the counties on the Eastern Shore (Outer Coastal Plain).

* * * * *

The above corrections reflect, in the main, what was or should have been known about Maryland herpetology when the book in question was written. For an up-to-date checklist of the Maryland herpetofauna see Maryland Herpetological Society Bulletin, Vol. 1, No. 1, November 1965, pp. 3-14.

John E. Cooper, Department of Zoology, University of Kentucky, Lexington, Kentucky, 40506.

Additional Records of *Lampropeltis getulus getulus* and
Lampropeltis calligaster rhombomaculata in Anne Arundel County, Maryland

The list below is of Eastern King Snakes, *Lampropeltis g. getulus*, and Mole Snakes, *Lampropeltis c. rhombomaculata*, from Anne Arundel County, Maryland, either collected or seen by the author.

- May 1963: Two adult Eastern King Snakes were found under a slab of tin, south of Curtis Bay (Swan Creek). One specimen, a female 32" in length, was kept in captivity until August. During that time it consumed 11 Fence Lizards, 5 Six-lined Racerunners, 3 baby Northern Watersnakes, and a Black Rat Snake of equal size (32"). It shed three times: June 19, July 13, and August 3.
- June 6, 1963: One young Eastern King Snake was taken in Green Haven, and another young specimen was found DOR along Duvall Highway, also in Green Haven.
- Fall 1963: A 10" Mole Snake was found in the Glen Burnie area and was brought to a zoology class at Glen Burnie High School. The snake was kept in captivity but refused to eat until November 7, when an 18" Dekay Snake was placed in the same cage. The Mole Snake then attempted to eat the Dekay Snake. They had to be separated because of the difference in size.
- May 20, 1964: A baby Eastern King Snake was found under a long tree branch in a marshy inlet near Rockview Beach.
- May 21, 1964: Two adult Eastern King Snakes were found mating under a board near Rockview Beach. They were taken on a wooded hillside above the inlet where the young King Snake was found the day before.
- May 31, 1964: An adult Eastern King Snake was taken in Green Haven. The snake had fallen into an old well in the woods and was trapped there.
- June 6, 1964: An adult Eastern King Snake, preparing to shed, was found under a board in Green Haven.
- June 7, 1964: An Eastern King Snake was seen DOR along Mountain Road north of Lake Shore.
- June 12, 1964: Two Eastern King Snakes were seen DOR south of Curtis Bay, one on Ft. Smallwood Road and the other on a side road.
- September 1, 1964: An adult Mole Snake was found crossing a road in the Glen Burnie area (Lombardi Beach) at about 3:00 p.m.
- Summer 1965: An Eastern King Snake was seen DOR along Solley Road north of Powhatan Beach.

Summer 1965: An adult Eastern King Snake was found coiled in the weeds near a wooded area in Green Haven.

Summer 1965: A young Eastern King Snake was found under an old door that was lying near a deserted building off Mountain Road in Green Haven.

Late Summer 1965: An adult Mole Snake was found in a field off Powhatan Beach Road in Powhatan Beach, lying across a path at mid-day.

Ken Nemures, Rt. 4, Box 51A, Pasadena, Maryland

Additional Records of *Pseudemys rubriventris* and
Pseudemys scripta elegans in Anne Arundel County, Maryland

August, 1962: A young Red-bellied Turtle, *Pseudemys rubriventris*, was collected in a large inlet about 1 mile north of Glen Burnie. This particular inlet is fed by a large fresh-water stream, but except for the immediate area where the stream empties into the inlet, the water is of a rather muddy brownish hue. Tall marsh plants such as cattails abound in many spots around the inlet, but there are no water lilies and only a few aquatic greens. The small turtle was sighted swimming near shore and collected as it started to submerge.

May, 1963: A small specimen of *P. rubriventris* was seen sunning on a log, close to the spot where the young individual was taken in 1962. The turtle was sighted on May 5 and was chased for over an hour without being caught. As soon as it dived off one log, it would crawl up on another on the other side of the small cove and continue sunning. The turtle was chased back and forth in this manner until the collector finally gave up and left. On May 18 the turtle was seen again on the same log where it was first observed on May 5. It was chased once again in the same manner and finally collected. The specimen was about 3 inches in length.

At least two large *P. rubriventris* were seen during 1963 in the inlet near Glen Burnie. One was observed sunning in the cove where the young individual and 3-inch specimen were collected, while the other was seen swimming in a different section of the inlet.

June 14, 1963: A baby Red-eared Turtle, *P. scripta elegans*, was found close to shore in the same part of the inlet near

Glen Burnie where the previous small rubriventris was recorded.

June 17, 1963: Another baby P. s. elegans was taken in the inlet near Glen Burnie, but in a different section than the one on June 14.

April 5, 1964: A large specimen of Pseudemys was seen sunning on a log at Swan Creek in one of three large ponds. The turtle was not captured but probably was rubriventris as this is the most common Pseudemys in the area. It was a sunny but cool day, with an air temperature of 52°F.

April 11, 1964: More large specimens of Pseudemys were observed sunning at Swan Creek. Air temperature on April 11 reached 66°F. One rubriventris shell was also found on shore near one of the ponds.

Other Pseudemys, possibly P. rubriventris, were seen sunning in the ponds at Swan Creek on April 26, May 2, and again on May 3.

May 30, 1964: A baby P. s. elegans was found sunning on a clump of weeds in a marshy pond at Swan Creek.

More large Pseudemys observed sunning at Swan Creek on June 5, June 9, and June 12, 1964.

June 16, 1964: A young P. s. elegans was found in the inlet north of Glen Burnie.

June 22, 1964: A total of four young P. s. elegans were collected at the inlet north of Glen Burnie.

August 10, 1964: A 2½-inch P. rubriventris was collected in a small puddle at the inlet just north of Glen Burnie.

October 14, 1964: A 2-inch P. s. elegans was found in one of several small ponds located in a quarry north of Glen Burnie. The quarry is behind Governor's Plaza on Md. Rt. 2.

March 13, 1965: A 2-inch P. rubriventris was found in a marshy pond near Maryland Beach. Two large rubriventris shells and one P. s. elegans shell were also found along the marshy edge of the pond.

March 18, 1965: A large P. rubriventris shell was found near Maryland Beach.

March 23, 1965: Another Pseudemys shell was found near Maryland Beach.

April 4, 1965: A 3-inch P. rubriventris was collected at Swan Creek.

May, 1965: A 1-inch and a 2½-inch P. rubriventris were found

near Maryland Beach. Another $2\frac{1}{2}$ -inch specimen was sighted but not caught.

Other rubriventris were sighted during the year in a marshy area off Maryland Rt. 2, just below Pasadena. A shell of P. s. elegans was found at Swan Creek, and an adult elegans was found DOR along Furnace Branch Road just north of Glen Burnie. The specimen was a female and had numerous eggs scattered about the body.

Ken Nemuras and Tom Sparhawk, Rt. 4, Box 51A, Pasadena, Maryland and 233 Kenwood Road, Riviera Beach, Maryland.

Notes on Xanthic Eastern Garter Snake, *Thamnophis s. sirtalis*

An unusual looking Eastern Garter snake, *Thamnophis s. sirtalis*, was collected by Charles Plankert of 5 South Beechfield Avenue, in a field near his home in Southwest Baltimore City. It was taken to the Southwestern District Police station. They in turn sent it to the Baltimore Zoo where it was identified by Mr. Frank Groves, Head Keeper of Reptiles.

The coloration of this snake is as follows: The head is an olive brown with a black band on its neck. This band is two scale rows wide. The eyes have a brownish iris. The chin is white as are the first four ventrals. The ground color is an olive yellow or pale yellow with black edges showing between each scale. The top of each scale is edged with orange. The belly has a dark olive stripe down the center which fades out near the edge of the first scale row. This dark olive stripe begins at the fifth ventral, and continues onto the subcaudals where it begins to fade.

This snake was kept in captivity for a period of a week and a half. It died from unknown causes on May 8, 1966, and was preserved and added to the zoo collection, number BZ 521.

John D. Groves, Animalkeeper, Baltimore Zoo Reptile House.

Notes on a Severed Black Rat Snake, Elaphe o. obsoleta

A woman phoned the Baltimore Zoo on March 21, 1966, and asked if she could send us a snake for identification.

Her husband brought the snake in the next day and left it at the reptile house. She had cut the snake in two with a shovel in her garden on Liberty Road. No further information was given. I examined the snake shortly after it was brought in. It was a juvenile Black Rat Snake, Elaphe o. obsoleta, measuring 17 inches in length. It had been cut at a point 5 inches behind the head. Although the snake had been cut in two nearly 24 hours before my identification, it was still flicking its tongue at a normal rate, opening its mouth in an attempt to bite, and making movements similar to the motions of a crawling snake. These movements concerned the anterior part of its body. The posterior portion of the body was lifeless.

I cut the head off just behind the neck and within 20 minutes to a half hour the pieces appeared to be lifeless.

It should be noted that a thick clot of blood and tissue sealed off the severed end of the anterior part of the snakes body. The only reason I can give for the snake's activity is that the brain and heart were both in the anterior portion of the body. For this reason I feel that the snake was actually alive and was not activated by any reflex actions.

John D. Groves, Animalkeeper, Baltimore Zoo Reptile House.

An Annotated List of Amphibians and Reptiles from the Broad Creek-
Deep Run Area, Harford County, Maryland

E. Clyde Prince, Robert Duppstadt, Daniel J. Lyons

In 1948 the Boy Scouts of America opened a large camp at Broad Creek, Harford County, Maryland. During the eight years the camp has been open, forty species and subspecies of the eighty-one amphibians and reptiles known to occur in Maryland (Fowler, James A., 1949, List of the amphibians and reptiles of Maryland and the District of Columbia, Acad. Nat. Sci. Phila., pp. 1-2, mimeo) have been collected at the locality. All specimens taken are in the private collection of the authors, but

* Reprinted from Maryland Naturalist, Vol. XXV, Nos. 1-4, 1955 with the authors' permission, and corrections to scientific names.

these are soon to be incorporated into the collection of the Natural History Society of Maryland.

The area studied comprises fifteen hundred acres in the Piedmont of Harford County, approximately two miles south of the Susquehanna River. The camp is trisected by Broad Creek and Deep Run Creek. The latter contacts the Susquehanna through Broad Creek. Mixed deciduous forests, coniferous forests, and broken fields fill the area, with occasional rocky outcrops. Included in this region is a virgin hemlock stand. Improved farm land surrounds the perimeter.

Most of the field work was accomplished in July and August of each year, and was done by the authors. Occasional specimens were contributed by scouts and camp staff members.

The private collection of Robert Lambert was generously donated for this study. Mr. John E. Cooper, Department of Herpetology, has been very helpful with advice and criticism.

Account of Species

Notophthalmus viridescens viridescens - Newts were very common in the area. Most of the specimens collected were eft's, which showed a distinct preference for slopes of hills in deciduous forests. Captives fed readily on earthworms and beetle larvae.

Desmognathus fuscus fuscus - This is the most abundant salamander of the region, being found in almost every stream, creek, and pond. Eggs were found on numerous occasions, often in rotting logs which had fallen in the streams. Frequently females were with them.

Plethodon cinereus cinereus - This is a common species but is seldom encountered due to its secretive habits. It shows a preference for moist situations near streams in deciduous forests.

Plethodon glutinosus glutinosus - The Slimy Salamander shows an erratic distribution here and is seldom found. When collected it is usually found in small congregations. The habitat preference is similar to that of cinereus.

Pseudotriton ruber ruber - The Red Salamander has been found in most of the springs and streams in the region. The largest taken measured 133 mm., the largest larva measured 88 mm.

Eurycea bislineata bislineata - The Two-lined Salamander has been collected in the same situations as Desmognathus, but not quite as abundantly.

Eurycea longicauda longicauda - Not a common species, the Long-tailed Salamander is sometimes found in rock crevices by cool water. The longest one captured, a male, measured 159 mm.

Bufo americanus americanus - The American Toad is found in most of the drier areas of the forests. It is often associated with the Fowler's Toad.

Bufo woodhousei fowleri - Fowler's Toad is found throughout the forested region and the open fields. It appears to be quite abundant, even congested in its range.

Acris crepitans crepitans - Two Cricket Frogs were collected in 1948 at the junction of Deep Run Creek and Broad Creek. Probably this frog is very abundant earlier in the year.

Hyla versicolor versicolor - One of the largest of the area's tree frogs, the Gray Tree Frog is more commonly heard than seen. However, many are picked up from bushes along Broad Creek Lake and Broad Creek. Young specimens are green in coloration.

Hyla crucifer crucifer - The Spring Peeper is occasionally captured in the early part of the season around marshes and ponds, but is seldom encountered after breeding.

Rana catesbeiana - Large Bullfrogs are very common throughout all of the wet areas of the region. At night they can be heard calling from 8:00 P. M. to 3:00 A. M. Many exceed 100 mm. in body length. In the spring, tadpoles of this species were often seen feeding on aquatic vegetation near the edge of Broad Creek Lake.

Rana clamitans melanota - The most common species of frog in the area was the Green Frog. It was found at every aquatic situation investigated.

Rana palustris palustris - Pickerel Frogs were found in the early summer at the edge of ponds and creeks. As the season advances they become more scarce. Few tadpoles of this species are ever seen.

Rana pipiens pipiens - In standing with its reputation as one of Maryland's commonest frogs, the Leopard Frog is found throughout most of the damp and wet areas of the region. They form the bulk of the food of the Water Snakes captured.

Rana sylvatica sylvatica - One of the more beautiful frogs found is the Eastern Wood Frog, although it is uncommon in the region.

Sceloporus undulatus hyacinthinus - Occasionally a Northern Fence Lizard is encountered along rocky cliffs in forested areas. They are somewhat common, but hard to capture. Several females were collected containing eggs. The average number of eggs was four.

Eumeces fasciatus - During the course of our collecting, ten Five-lined Skinks were collected. They were found in a variety of dry habitats, but prevalently in rocky areas. One specimen was found on the south bank of the Susquehanna, approximately

$\frac{1}{2}$ mile south of the Mason-Dixon Marker, in 1952.

Carpophis amoenus amoenus - The Eastern Worm Snake is fairly common in the area, but is rarely seen because of its burrowing habits. The species shows a distinct preference for slopes of deciduous forests.

Diadophis punctatus edwardsi - Another fairly common snake of the region is the Northern Ring Neck. Specimens have been found all over the reservation.

Several specimens are captured annually which appear to exhibit characteristics of both punctatus punctatus and punctatus edwardsi.

Heterodon platyrhinos platyrhinos - The common Hog-nose represents one of the area's most familiar species. Specimens of both the common phase and the black phase have been found in a variety of habitats, including open fields and the banks of streams. The largest specimen taken was 900 mm. in length. The smallest were newly-hatched young, about 146 mm. in length.

Coluber constrictor constrictor - A rather hard to find species in this area is the Black Racer. Very few specimens are captured per annum.

Elaphe obsoleta obsoleta - The Pilot Black Snake is the most common snake to be found in the area, as many as five specimens having been collected in one day. The most productive spot for this species is a large hollow tree near Deep Run Creek.

Lampropeltis dolista triangulum - Another species which is found in the area but is by no means common is the Northern Milk Snake. The number of juvenile specimens captured out numbers the adults almost two to one. The majority of specimens examined had reddish-orange blotches, while others were marked with blotches of brown and gray.

Regina septemvittata septemvittata - Broad Creek provides excellent ecological background for this species. Specimens are seldom seen during the daylight hours, but are most often taken at night. The species is by no means common in this area.

Natrix sipedon sipedon - The Northern Banded Water Snake is very widely distributed throughout the area.

Storeria dekayi dekayi - De Kay's Snake is very rare in this area. One specimen is available.

Haldea valeriae valeriae - Another very rare species in the Broad Creek area. Only three specimens of the Eastern Ground Snake have been recorded from the area.

Thamnophis sirtalis sirtalis - The Eastern Garter Snake is seldom seen in this area. Few specimens are captured annually.

Thamnophis sauritus sauritus - The Eastern Ribbon Snake has

adapted itself to all ecological habitats in the area.

Ancistrodon contortrix mokeson - The Copperhead is the only poisonous snake in this area. Specimens are usually found sunning themselves on rocks in the three quarries found bordering Deep Run Creek. Other specimens have been captured throughout the area.

Sternotherus odoratus - Along the edges of ponds and lakes, the Musk Turtle is seen feeding on small minnows and vegetable matter. Not many of these have been collected, but many have been seen.

Kinosternon subrubrum subrubrum - The Mud Turtle is rather rare in the area, but it breeds here. Eggs and young have been collected.

Chelydra serpentina serpentina - Common Snapping Turtles are found often through the season in ponds and lakes throughout the region. Specimens of 25 pounds have been verified.

Clemmys guttata - The Spotted Turtle is reasonably common in this area. It is distinct in its preference for ponds and lakes, and captives are ready feeders.

Clemmys insculpta - In some of the deciduous forests, an occasional Wood Turtle is picked up. Most specimens are over 130 mm. in carapace length. Females predominated in our collection.

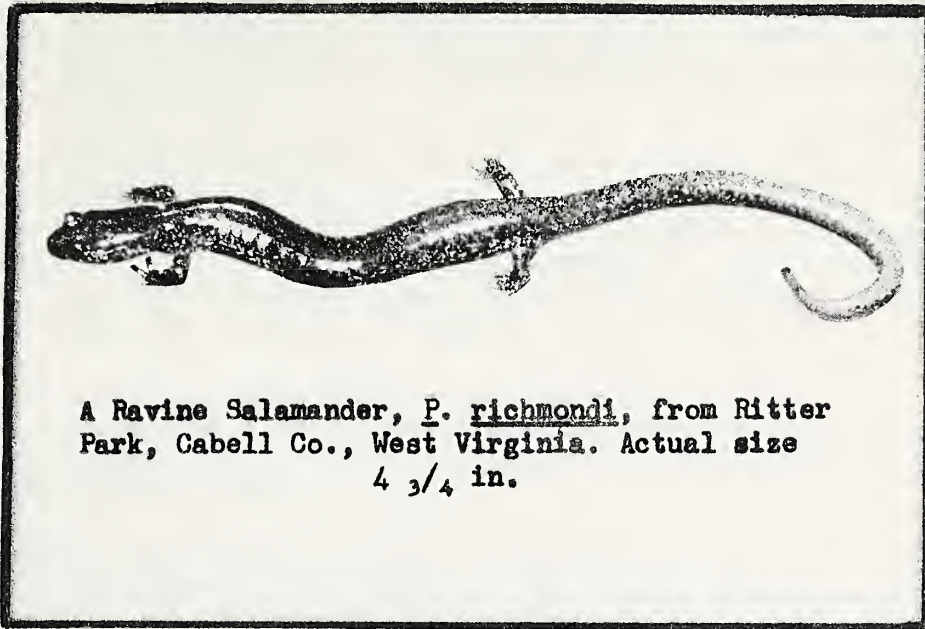
Clemmys muhlenbergi - The Muhlenberg's Turtle has been found three times in the area. In 1952 Daniel J. Lyons obtained two adults. In 1954 Robert Duppstadt collected two specimens, on July 12th and August 24th, respectively. Both were adult females. The available live female captured July 10th, 1955, is an adult female. Measurements: carapace, 102 mm.; carapace width at bridge, 67 mm.; at widest part, posteriorly to bridge, 69 mm.; plastron length, 85 mm. This specimen is very tame and feeds readily on small frogs.

Terrapene carolina carolina - The most common turtle of the area is the Eastern Box Turtle. It is found throughout the wooded areas and fields of the region.

Chrysemys picta picta - The Eastern Painted Turtle is fairly common in the larger ponds and streams. Most collected were young under 55 mm. in length.

THE RAVINE SALAMANDER IN MARYLAND *

C. J. Stine¹ and J. A. Fowler²



The inclusion of the ravine salamander, Plethodon richmondi Netting and Mittleman, in the herpetofauna of Maryland is based on a single specimen in the Carnegie Museum (CM 12928) and six specimens in the University of Maryland collection [514 (6)] .

According to the description of Netting and Mittleman (1938) the Carnegie Museum specimen is typical, being 4.5 inches in length with 21 costal grooves, counting two that are joined just in front of the hind legs. It was collected by Mr. Leonard Llewellyn on June 6, 1937, from beneath a decaying log adjacent to a small branch of Moores Run on the edge of a valley field. The locality is 3.75 mi. south of East Lonaconing in Allegany County. Duellman (1954) has found the habitat preference in southwestern Ohio to be under rocks on wooded slopes, less commonly under logs and bark. Netting and Mittleman (1938) state that this salamander "exhibits a marked preference for the slopes of valleys and ravines, never occurring

¹Natural History Society of Maryland

²Director of Education, Academy of Natural Sciences of Philadelphia

*Reprinted from Maryland Naturalist, Vol. XXVI, Nos. 1-4, 1956 with the authors' permission.

on hill tops and only rarely on the valley floor". Thus the habitat of the Carnegie Museum specimen may be considered somewhat atypical.

Physiographically the Carnegie specimen was collected on the eastern edge of the Allegheny Plateau near the western face of the Allegheny Front, Dans Mountain (Fenneman, 1938). This species also occurs on the Allegheny Plateau in Pennsylvania and in West Virginia (Wilson and Friddle, 1950).

The six University of Maryland specimens were recently brought to the attention of the senior author by Dr. Richard Highton. They had been originally misidentified as lead-backed salamanders, Plethodon cinereus cinereus. They were collected by W. F. Keller on May 11, 1945 at an old sawmill. The locality was 2.5 miles north of Cumberland on the Bedford Road in Allegany County.

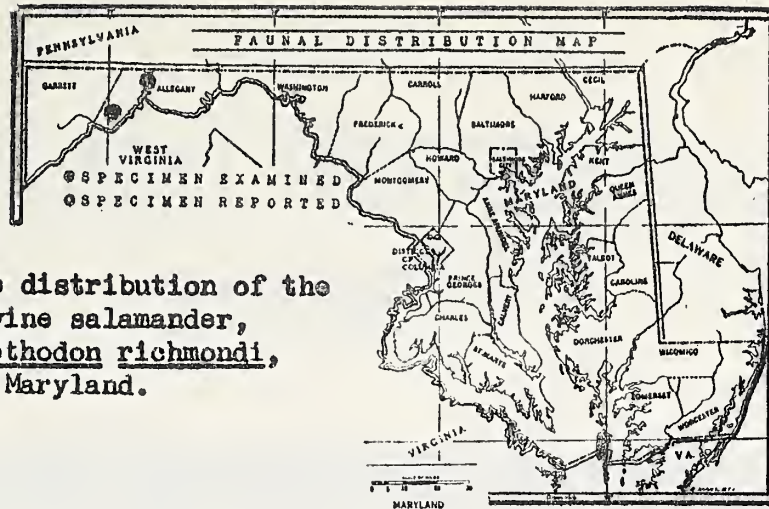
Physiographically these specimens were collected on the western edge of the Valley and Ridge Province. The nearest Pennsylvania locality is 1.5 miles east of Mann's Choice in Bedford County, also in the Valley and Ridge.

Bishop (1947) indicates in his distribution map of P. richmondi that it extends eastward in the Valley and Ridge Province as far as Washington County. We are presently unaware of any records justifying this extension. It is hoped that this note will result in intense investigation of this form in Maryland to better define its distributional limits in the State.

The distinguishing features of P. richmondi and P. c. cinereus are listed herewith to facilitate differential diagnosis between the two species which are often confused.

<u>P. richmondi</u>	<u>P. c. cinereus</u> (lead phase)
Costal grooves 19-22	Costal grooves 17-20
Comparatively longer trunks than <u>P. c. cinereus</u>	Shorter trunk than <u>P. richmondi</u>
Uniformly dark throat and venter	Mottled "salt-and-pepper" effect of throat and venter
Found most commonly on valley slopes, rarely on valley floors and not on hilltops	Found commonly on hilltops as well as slopes and valley floors

The authors would like to express their thanks to Mr. Leonard Llewellyn, Mr. Neil D. Richmond and Dr. Richard Highton for generously supplying information regarding these records.



The distribution of the
raine salamander,
Plethodon richmondi,
in Maryland.

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Ed. Note:

Since the publication of this article in 1956, numerous other specimens as well as localities have come to light. Most have been in the previously known range in western Allegany Co. A few records have shown that Plethodon r. richmondi occurs farther east. Richard Franz collected a specimen in Allegany Co., approx. 5 mi. W. of Sideling Creek, which is just west of the Allegany-Washington Co. line. Dr. Richard Highton informs me of a specimen collected 5 mi. E. Hancock in Washington Co. The latter record was included in the Distributional Survey in Vol. 1, No. 1 of the Bulletin of the Maryland Herpetological Society. Further collecting in Western Maryland may help to define the range of P. r. richmondi even more clearly.

BULLETIN of the

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U. S. NATIONAL MUSEUM

MARYLAND HERPETOLOGICAL SOCIETY



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The Cover:

Pseudacris t. kalmi in amplexus. Specimens are
from nr. Massey, Kent Co., Md. Photo by
Dr. Robert S. Simmons.

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The list of corrections to Snakes of Maryland which appeared in the last Bulletin (Bull. Md. Herp. Soc. 2 (3): 1-4) was formulated for Society members, since the publication is distributed free with membership.

The Preservation of Amphibians

With Regard to Color Retention and Flexibility

The question - is there a better preservative for amphibians than that in common use - has concerned herpetologists for quite some time. The author believes that the answer to this question is yes !

Introduction

The purpose of this project is to formulate a solution, through research and experimentation, that will not only preserve amphibians but will also cause them to retain more of their natural color and flexibility for a longer period of time than the preservative in common use. The preservative commonly used is formaldehyde.¹ What the author has done is test some of the known preservatives recommended for amphibians and attempted to ascertain just how valid they are as preservatives, as original color retainers and whether or not they leave the specimen in such a state of flexibility as to allow it to be identified by use of a standard key. The author has also tested some experimental preservatives of his own. It is not the purpose of this project to investigate the actions of chemicals on the color pigment in the skin of the specimens.

Background

The major portion of information used in this project was taken from articles which appeared in magazines published in the United States during the last fifty years. These articles were vague in that they gave only a formula and the recommendation that it was a preservative and that it was good for color retention. They did not mention whether their particular formula had been tested for color retention or flexibility and consequently no test results were available.

The information from the leading museums - American Museum of Natural History, Academy of Science of California and the Smithsonian Institution was precise as to formula but did not contain any test results.

The herpetologists in the Baltimore area were found to use formaldehyde diluted 1:10, that is, one part formaldehyde to ten parts of water to preserve their specimens.² This solution closely follows those recommended by the above museums and keeps the specimens in an excellent state of preservation but again no

Ed. note: This paper is in part, a dissertation submitted in partial fulfillment of the requirements for a Bachelor of Arts Degree at Towson State College, 1963.

color notation or flexibility information is available.

It is obvious by now that there are several solutions used for the preservation of amphibians and especially obvious that none of them has been tested for their color retention and flexibility qualities. This is precisely what the author has attempted to do.

Equipment

The necessary equipment and chemicals for the project were assembled in the early spring of 1963. The measuring equipment was of standard laboratory type and included:

- 1 610 Gram Capacity Scale
- 1 50 ml. Cylinder
- 1 2-oz. Cylinder
- 2 500 ml. Beakers
- 72 3-oz. Olive Jars

The jars are of the same general type used by museums and colleges to house their preserved specimens.⁵ The lids and lid-seals are coated so as to be resistant to fluids by their distributor, The Atlantic Glass Company, Baltimore, Maryland.

The chemicals were obtained from the Mallinckrodt Company, New York, N. Y., and from the chemical storeroom at Towson State College. Mr. Arthur C. Yarbrough supervised their removal.

Treatment of Specimens

All the specimens used for the project are the same species, Desmognathus fuscus fuscus, and were collected within a 40-mile-radius of Baltimore City. The necessary collection data is found on their respective test chart results. All the specimens for the project were collected during the late spring and early summer of 1963 and preserved on the same day they were collected.

Thirteen solutions were tested. Every fourth solution throughout the project contained specimens preserved in a 10% solution of formaldehyde and stored in the same areas (A, B and C) as the specimens used in the test solutions. These control solutions (numbered 4, 8 and 12) were used to determine the long period of time referred to on page no. 1. The test solutions numbered 1, 2, 3, 5, 6, 7, 9, 10, 11 and 13. All of the specimens used in the project received a weekly color notation check and the amount of color fading of the specimens in the control solution was recorded along with the rate of color fading of the specimens in the test solution.

The color notation of the specimens was accomplished in the following manner:

Immediately preceding the killing of the specimen its color was matched with the same color on the student Munsell Color Chart.

The location of the juncture of the Atlas vertebra and the skull was determined. A color chit of the student Munsell Color Chart, which had a 4mm hole punched in its center was placed over this point so that the juncture of Atlas vertebra and the specimen's skull were in the center of the hole. The hue, value and chroma of the specimen were matched with the hue, value and chroma of the proper chit and a record of this information made. This same procedure was followed every seven days. Each specimen was removed from the preservative when the color notation was made.

All the specimens were killed with the solution that was to serve as their preservative by injecting it into the specimen's heart. The abdominal cavity was then filled by injecting the solution into it by way of the anal orifice.

Three specimens of the same type were used for each test solution. The specimen sample marked (A) was subjected to strong light. It was placed in a basement window, of the author's home, which affronts on a main street of this city. In this position the specimen was subjected to direct sunlight from the time of sunrise till 12:00 o'clock, noon, after which it was subjected to intense indirect sunlight until sunset. The light reaches a maximum intensity reading of 45 on the Votar photo electric cell at 12:00 o'clock, noon, thereafter it gradually falls to 0 at sunset. The Votar photo electric cell is an instrument used for determining the intensity of light.

The specimen sample marked (B) was placed in subdued light. It was placed on a shelf which joined the above mentioned window on the same level at an angle of forty-five degrees (45°). A single piece of white cotton cloth (62 threads to the inch) was hung in front of these specimens. The maximum light intensity reached on the shelf was 1 on the Votar photo electric cell.

The sample specimen marked (C) was stored in total darkness. These specimens were stored in a cabinet which afforded absolutely no light.

All specimens stayed in their respective positions throughout the project except when the color notation was made.

These positions were chosen because they closely duplicate the types of storage conditions under which herpetological specimens are found.⁴

The same preservation and color notation procedures were used throughout the entire project.

The following pages will give the results for each solution tested. The reader will find:

1. The formula for the solution tested.
2. The source of the formula.
3. Collection data for the specimen used.
4. The record of the color notation of the specimens written in Munsell terminology. It is beyond the scope of this paper to go into an explanation of the Munsell color notation theory. If the reader wishes a thorough

understanding of this approach to the classification of color it may be obtained by referring to the book A Color Notation by Albert H. Munsell.⁵ So that the charts may be of value to the reader an explanation of what the numbers and letters stand for is as follows: The numbers 5.0 or 10.0 indicate the number of the hue and the letter following one of these numbers indicates the particular hue or color. The numbers under these indicate the value (degree of lightness or darkness of the color) and the chroma (degree of strength or weakness of the color). For example, 5.0 R would indicate the color of a ripe tomato. 4/14

The particular hues used in the project are:

R - Red
YR - Yellow-Red

Solution No. 1

16 ml Formaldehyde 40%
27 ml Glycerine

11 ml Alcohol 95%
300 ml Water

Source: Sloane, T. O'Connor. Henley's Twentieth Century Book of Formulas, Processes and Trade Secrets, Norman W. Henley Publishing Co., 17-19 West 45th Street, New York, N. Y., 1945, p. 602.

Species: Desmognathus fuscus fuscus.

Locality: Druid Hill Park, Baltimore, Md.

Date: June 18, 1963.

Collector: Daniel J. Lyons.

Color Notation Record

<u>Jar 1A</u>	<u>Jar 1B</u>	<u>Jar 1C</u>	<u>Date</u>
5.0 YR 2/2	5.0 YR 2/2	5.0 YR 2/2	June 18, 1963
5.0 YR 2/2	5.0 YR 3/2	10.0 YR 2/2	June 23, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	June 30, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	July 7, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	July 14, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	July 21, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	July 28, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	August 4, 1963

<u>Jar 1A</u>	<u>Jar 1B</u>	<u>Jar 1C</u>	<u>Date</u>
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	August 11, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	August 18, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	August 25, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 1, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 8, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 15, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 22, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 29, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	October 6, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	October 13, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	October 20, 1963

Hue Change	1	1	1	Total number of color notation changes for all three positions-
Value Change	0	1	0	
Chroma Change	0	0	0	

4

Solution No. 2

13 ml Formaldehyde 40% 242 ml Water
26 ml Glycerine

Source: Lloyd, W. L. "Bob and Bess Find a New Hobby." Recreation,
July, 1946, Vol. 49, p. 191-3.

Species: Desmognathus fuscus fuscus.

Locality: Y.M.C.A., Towson, Maryland.

Date: June 25, 1963.

Collector: Daniel J. Lyons.

Color Notation Record

<u>Jar 2A</u>	<u>Jar 2B</u>	<u>Jar 2C</u>	<u>Date</u>
10.0 YR 2/2	5.0 YR 2/2	10.0 YR 2/2	June 25, 1963
10.0 YR 2/2	5.0 YR 2/2	10.0 YR 2/2	June 30, 1963
10.0 YR 2.2	10.0 YR 2/2	10.0 YR 2/2	July 7, 1963

<u>Jan 2A</u>	<u>Jan 2B</u>	<u>Jan 2C</u>	<u>Date</u>
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	July 14, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	July 21, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	July 28, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	August 4, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	August 11, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	August 18, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	August 25, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 8, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 18, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 22, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 29, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	October 6, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	October 13, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	October 20, 1963
Hue Change 0	1	0	Total number of color notation changes for all three positions - 2
Value Change 1	0	0	
Chroma Change 0	0	0	

Solution No. 3

223 ml Water 49 grams Hexamine
25 ml Formaldehyde 40%

Source: Wagstaffe, R. and Fidler, J. Havelock. The Preservation of Natural History Specimens, Vol. 1, Invertebrates, Philosophical Library.

Species: Desmognathus fuscus fuscus.

Locality: Y.M.C.A., Towson, Maryland

Date: June 28, 1963

Collector: Daniel J. Lyons.

<u>Jan 3A</u>	<u>Jan 3B</u>	<u>Jan 3C</u>	<u>Date</u>
5.0 YR 2/2	10.0 YR 2/2	5.0 YR 2/2	June 28, 1963

<u>Jar 3A</u>	<u>Jar 3B</u>	<u>Jar 3C</u>	<u>Date</u>
10.0 YR 3/2	10.0 YR 2/2	5.0 YR 2/2	June 30, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	July 7, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 3/2	July 14, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 3/2	July 21, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	July 28, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	August 11, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	August 18, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	August 25, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 1, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 8, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 15, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 29, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	October 6, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	October 13, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	October 20, 1963
Hue Change 1	0	1	Total number of color notation changes for all three positions - 5
Value Change 1	1	1	
Chroma Change 0	0	0	

Solution No. 4

26 ml Formaldehyde
230 ml Water

Source: United States National Museum, Department of Zoology.
"Suggestions for Collecting and Preserving Reptiles
and Amphibians."

Species: Desmognathus fuscus fuscus.

Locality: Lake Roland, Baltimore County, Maryland.

Date: July 7, 1963

Collector: Daniel J. Lyons.

Color Notation Record

<u>Jar 4A</u>	<u>Jar 4B</u>	<u>Jar 4C</u>	<u>Date</u>
5.0 YR 2/2	5.0 YR 2/2	5.0 YR 2/2	July 7, 1963
10.0 YR 4/2	10.0 YR 4/2	10.0 YR 3/2	July 14, 1963
10.0 YR 4/2	10.0 YR 4/2	10.0 YR 3/2	July 21, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	July 28, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	August 4, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	August 11, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	August 18, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	August 25, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	Sept. 1, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	Sept. 8, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	Sept. 15, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	Sept. 22, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	Sept. 29, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	October 6, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	October 13, 1963
10.0 YR 5/2	10.0 YR 5/2	10.0 YR 3/2	October 20, 1963

Hue Change 1
Value Change 3
Chroma Change 0

1
3
0

Total number of
color notation
changes for all
three positions -
10

Solution No. 5

16 ml Formaldehyde
300 ml Water

25 grams Hexamine
28 ml Glycerine

Source: Author's Experimental Solution.

Species: Desmognathus fuscus fuscus.

Locality: Conowingo, Cecil County, Maryland.

Date: July 13, 1963.

Collector: Daniel J. Lyons
James G. Kimos
Peter F. Kimos
James Koehneke

Color Notation Record

<u>Jar 5A</u>	<u>Jar 5B</u>	<u>Jar 5C</u>	<u>Date</u>
5.0 YR 2/2	5.0 YR 2/2	5.0 YR 2/2	July 14, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	July 21, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	July 28, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 4, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 11, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 18, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 25, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 1, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 8, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 15, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 22, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 29, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	October 6, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	October 13, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	October 20, 1963
Hue Change 1	1	1	Total number of color notation change for all three positions - 3
Value Change 0	0	0	
Chroma Change 0	0	0	

Solution No. 6

318 ml Alcohol 95%
90 ml Water

Source: Pike, N. "The Preservation of Natural Objects in Alcohol
and Other Solutions", Scientific American, December 15,

1900, Vols. 49-50, p. 20875, Supp. 1302.

Species: Desmognathus fuscus fuscus.

Locality: Conowingo, Cecil County, Maryland.

Date: July 13, 1963.

Collector: Daniel J. Lyons
James G. Kimos
Peter F. Kimos
James Koehneke

Color Notation Record

<u>Jar 6A</u>	<u>Jar 6B</u>	<u>Jar 6C</u>	<u>Date</u>
10.0 YR 2/2	5.0 YR 2/2	5.0 YR 2/2	July 14, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	July 21, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	July 28, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 4, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 11, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 18, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 25, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 1, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 8, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 15, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 22, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	Sept. 29, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	October 6, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	October 13, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	October 20, 1963
Hue Change 1	1	1	Total number of
Value Change 0	0	0	color notation
Chroma Change 0	0	0	changes for all
			three positions -
			3

Solution No. 7

14 grams Sodium Floride
6 ml Formaldehyde 40%
284 ml Water

(Allow injected specimen to
) remain in this solution for
(24 hours.

120 ml Glycerine
285 ml Water

(After 24 hours place specimen
) in this solution permanently.

28.35 grams Magnesium Chloride
5.67 grams Sodium Floride

Source: Author's trial formula.

Species: Desmognathus fuscus fuscus.

Locality: Y.M.C.A., Towson, Maryland.

Date: July 12, 1963.

Collector: Daniel J. Lyons.

Color Notation Record

<u>Jar 7A</u>	<u>Jar 7B</u>	<u>Jar 7C</u>	<u>Date</u>
10.0 YR 3/2	5.0 YR 2/2	10.0 YR 2/2	July 14, 1963 (Fixing Solution)
10.0 YR 3/2	5.0 YR 2/2	10.0 YR 2/2	July 15, 1963 (Transferred to
5.0 YR 3/2	5.0 YR 3/2	10.0 YR 2/2	Present Solution)
5.0 R 3/2	5.0 YR 3/2	10.0 YR 2/2	July 21, 1963
5.0 R 3/2	5.0 YR 3/2	10.0 YR 2/2	July 28, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	August 4, 1963
5.0 R 3/2	5.0 R 2/2	10.0 YR 2/2	August 11, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	August 18, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	August 25, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	Sept. 1, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	Sept. 8, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	Sept. 15, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	Sept. 22, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	Sept. 29, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	October 6, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	October 13, 1963
5.0 R 3/2	5.0 R 3/2	10.0 YR 2/2	October 20, 1963

Hue Change	3	2	0	Total number of color notation changes for all three positions - 4
Value Change	0	0	0	
Chroma Change	0	0	0	

Solution No. 8

26 ml Formaldehyde 40%
230 ml Water

Source: United States National Museum, Department of Zoology,
"Suggestions for Collecting and Preserving Reptiles and
Amphibians."

Species: Desmognathus fuscus fuscus.

Locality: Conowingo, Cecil County, Maryland

Date: July 13, 1963

Collector: Daniel J. Lyons
James G. Kimos
Peter F. Kimos
James Koehneke

Color Notation Record

<u>Jar 8A</u>	<u>Jar 8B</u>	<u>Jar 8C</u>	<u>Date</u>
5.0 YR 2/2	5.0 YR 2/2	5.0 YR 2/2	July 14, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	July 21, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	July 28, 1963
10.0 YR 2/2	10.0 YR 2/2	10.0 YR 2/2	August 4, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	August 11, 1963
10.0 YR 3/2	10.0 YR 2/2	10.0 YR 2/2	August 18, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	August 25, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 1, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 8, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 15, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 22, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	Sept. 29, 1963

10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	October 6, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	October 13, 1963
10.0 YR 3/2	10.0 YR 3/2	10.0 YR 3/2	October 20, 1963

Hue Change	1	1	1	Total number of color notation changes for all three positions - 6
Value Change	1	1	1	
Chroma Change	0	0	0	

Solution No. 9

13 ml Formaldehyde 40 %
242 ml Water

Source: Breen, J. F. "How to Preserve Specimens," Hobbies,
June, 1945, Vol. 50, pp. 116-17.

Species: Desmognathus fuscus fuscus.

Locality: Conowingo, Cecil County, Maryland.

Date., July 13, 1963

Collector: Daniel J. Lyons
James G. Kimos
Peter F. Kimos
James Koehneke

Color Notation Record

<u>Jan 9A</u>	<u>Jan 9B</u>	<u>Jan 9C</u>	<u>Date</u>
5.0 YR 3/2	5.0 YR 2/2	5.0 YR 3/2	July 18, 1963
10.0 YR 4/2	10.0 YR 4/2	10.0 YR 4/2	July 28, 1963
10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	August 4, 1963
10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	August 11, 1963
10.0 YR 5/2	10.0 YR 4/4	10.0 YR 4/4	August 18, 1963
10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	August 25, 1963
10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	Sept. 1, 1963
10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	Sept. 8, 1963

	10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	Sept. 15, 1963
	10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	Sept. 22, 1963
	10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	Sept. 29, 1963
	10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	October 6, 1963
	10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	October 13, 1963
	10.0 YR 5/2	10.0 YR 4/2	10.0 YR 4/2	October 20, 1963
Hue Change	0	1	1	Total number of color notation changes for all three positions - 6
Value Change	2	2	1	
Chroma Change	0	1	0	

Solution No. 10

8 ml Formaldehyde 40%
247 ml Water

Source: "Formaldehyde as a Preservative," Scientific American,
February 3, 1900, Vols. 82-83, p. 20157, Supp. 49.

Species: Desmognathus fuscus fuscus.

Locality: Conowingo, Cecil County, Maryland.

Date: July 13, 1963.

Collector: Daniel J. Lyons.

Color Notation Record

<u>Jar 10A</u>	<u>Jar 10B</u>	<u>Jar 10C</u>	<u>Date</u>
5.0 YR 2/2	5.0 YR 3/4	10.0 YR 2/2	July 18, 1963
10.0 YR 2.2	10.0 YR 4/2	10.0 YR 3/2	July 28, 1963
10.0 YR 2/2	10.0 YR 4/2	10.0 YR 3/2	August 4, 1963
10.0 YR 2/2	10.0 YR 4/2	10.0 YR 3/2	August 11, 1963
10.0 YR 3/2	10.0 YR 4/2	10.0 YR 3/2	August 18, 1963
10.0 YR 3/2	10.0 YR 4/2	10.0 YR 3/2	August 25, 1963
10.0 YR 3/2	10.0 YR 4/2	10.0 YR 3/2	Sept. 1, 1963
10.0 YR 3/2	10.0 YR 4/2	10.0 YR 3/2	Sept. 8, 1963

	10.0 YR	10.0 YR	10.0 YR	Sept. 15, 1963
	3/2	4/2	3/2	
	10.0 YR	10.0 YR	10.0 YR	Sept. 22, 1963
	3/2	4/2	3/2	
	10.0 YR	10.0 YR	10.0 YR	Sept. 29, 1963
	3/2	4/2	3/2	
	10.0 YR	10.0 YR	10.0 YR	October 6, 1963
	3/2	4/2	3/2	
	10.0 YR	10.0 YR	10.0 YR	October 13, 1963
	3/2	4/2	3/2	
	10.0 YR	10.0 YR	10.0 YR	October 20, 1963
	3/2	4/2	3/2	
Hue Change	1	1	0	Total number of
Value Change	1	1	1	color notation
Chroma Change	0	1	0	changes for all
				three positions -
				6

Solution No. 11

9 ml Formaldehyde 40 %
291 ml Water
18 grams Hexamine
30 ml Glycerine
3 grams Salicylic Acid

Source: Author's experimental solution

Species: Desmognathus fuscus fuscus.

Locality: Conowingo, Cecil County, Maryland.

Date: July 13, 1963

Collector: Daniel J. Lyons
James G. Kimos
Peter F. Kimos
James Koehneke

Color Notation Record

<u>Jar 11A</u>	<u>Jar 11B</u>	<u>Jar 11C</u>	<u>Date</u>
5.0 YR	10.0 YR	10.0 YR	July 18, 1963
2/2	2/2	2/2	
5.0 YR	10.0 YR	10.0 YR	July 28, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	August 4, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	August 11, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	August 18, 1963
2/2	2/2	3/2	

5.0 YR	10.0 YR	10.0 YR	August 25, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	Sept. 1, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	Sept. 8, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	Sept. 15, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	Sept. 22, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	Sept. 29, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	October 6, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	October 13, 1963
2/2	2/2	3/2	
5.0 YR	10.0 YR	10.0 YR	October 20, 1963
2/2	2/2	3/2	
Hue Change	0	0	Total number of
Value Change	0	1	color notation
Chroma Change	0	0	changes for all
			three positions -
			1

Solution No. 12

26 ml Formaldehyde 40%
230 ml Water

Source: United States National Museum, Department of Zoology.
"Suggestions for Collecting and Preserving Reptiles and
Amphibians."

Species: Desmognathus fuscus fuscus.

Locality: Y.M.C.A., Towson, Maryland.

Date: July 25, 1963.

Collector: Daniel J. Lyons.

Color Notation Record

<u>Jar 12A</u>	<u>Jar 12B</u>	<u>Jar 12C</u>	<u>Date</u>
5.0 YR	10.0 YR	5.0 YR	July 25, 1963
3/4	2/2	2/2	
10.0 YR	10.0 YR	10.0 YR	July 28, 1963
5/2	2/2	2/2	
10.0 YR	10.0 YR	10.0 YR	August 4, 1963
5/2	2/2	2/2	

10.0 YR	10.0 YR	10.0 YR	August 11, 1963
5/2	2/2	2/2	
10.0 YR	10.0 YR	10.0 YR	August 18, 1963
5/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	August 25, 1963
5/2	3/2	3/2	
10.0 YR	10.0 YR	10.0 YR	Sept. 1, 1963
5/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	Sept. 8, 1963
5/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	Sept. 15, 1963
6/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	Sept. 22, 1963
6/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	Sept. 29, 1963
6/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	October 6, 1963
6/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	October 13, 1963
6/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	October 20, 1963
6/2	3/2	2/2	
Hue Change	1	0	Total number of
Value Change	3	1	color notation
Chroma Change	0	0	changes for all
			three positions -
			6

Solution No. 13

5 ml Formaldehyde 40%	30 grams Sugar
9 ml Glycerine	100 ml Water
3 ml Alcohol	

Source: Author's experimental solution.

Species: Desmognathus fuscus fuscus.

Locality: Y.M.C.A., Towson, Maryland.

Date: July 28, 1963.

Collector: Daniel J. Lyons.

Color Notation Record

<u>Jar 13A</u>	<u>Jar 13B</u>	<u>Jar 13C</u>	<u>Date</u>
10.0 YR	5.0 YR	10.0 YR	July 28, 1963
2/2	2/2	2/2	
10.0 YR	10.0 YR	10.0 YR	August 4, 1963
2/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	August 11, 1963
2/2	3/2	2/2	
10.0 YR	10.0 YR	10.0 YR	August 18, 1963
2/2	3/2	2/2	

10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	August 25, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 1, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 8, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 15, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 22, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	Sept. 29, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	October 6, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	October 13, 1963
10.0 YR 2/2	10.0 YR 3/2	10.0 YR 2/2	October 20, 1963

Hue Change	0	1	0	Total number of
Value Change	0	1	0	color notation
Chroma Change	0	0	0	changes for all
				three positions -
				2

Conclusion

The results of this project seem to indicate that solutions 11, 13, 2, 5 and 6, respectively, are superior to formaldehyde in their color retention qualities. The results are based on the total number of color notation changes for each solution in all three positions. All the specimens used in the project were flexible enough to be identified by use of a standard key at the time the project was terminated. The author realizes that the six months needed to bring the project to its present point is not sufficient time to yield conclusive results. What the author hopes is that this information will awaken an interest in this problem and serve as a reference for future work.

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MHS Field Trip: Number 1, Summer 1966

On Saturday, 4 June 1966, at 8:00 AM the first field trip of the Maryland Herpetological Society was held.

The purpose of this field trip was to expose the MHS members to the varied habitats of the amphibians and reptiles inhabiting southern Maryland. It was also hoped to obtain material that might be of use in furthering the knowledge of herpetology in the state. The field trip was concentrated on the St. Mary's County area.

At the junction of Md. Rt. 6 and Md. Rt. 5 two groups were formed. One group was to collect along Md. Rt. 5 and the other group was to collect Md. Rt. 6.

The collecting notes for the Md. Rt. 5 group were as follows: On Md. Rt. 5, 0.5 miles north of the junction of Md. Rt. 5 and Md. Rt. 238, three Carphophis a. amoenus, one Coluber c. constrictor and one Eumeces fasciatus were collected. The area in which these specimens were collected was densely wooded. A large number of fallen trees supplied ample cover.

An abandoned house and sawdust pile, 0.3 miles north of the junction of Md. Rt. 238 and Md. Rt. 5, on Md. Rt. 5, was searched for specimens. One large female Elaphe o. obsoleta was taken while sunning in a tree at the edge of the sawdust pile.

On Md. Rt. 242 (Cotton Pt. Rd.), 0.5 miles south of Md. Rt. 5, another abandoned house was investigated. A Terrapene c. carolina was sighted but not collected. An adult Coluber c. constrictor and an adult Elaphe o. obsoleta were sighted but escaped.

Near a stream, 0.5 miles NE of Md. Rt. 234 on Cotton Point Rd. an adult Ambystoma maculatum and several Ambystoma opacum larvae were collected in some transient ponds.

A number of sawdust piles on Pincushion Rd., 0.5 miles north of Md. Rt. 237 were checked. Only a sub-adult Ambystoma maculatum was taken.

On Compton Rd., 0.4 miles south of Md. Rt. 5 several Rana s. sylvatica tadpoles were collected. Also a young Terrapene c. carolina and Carphophis a. amoenus were taken.

Between the hours of 2:30 PM and 5:00 PM extremely high temperatures prevented collecting. The group proceeded to Point Lookout. At 5:30 PM collecting resumed.

At the junction of Md. Rt. 489 and Md. Rt. 235 a Coluber c. constrictor and Carphophis a. amoenus were collected near an abandoned house.

The last stop was at several sawdust piles at the junction of Indian Bridge Rd. and St. Andrews Rd. This area produced the greatest variety of specimens on the trip. One Carphophis a. amoenus, one juvenile Lampropeltis g. getulus, three Ambystoma opacum, several Scaphiopus holbrookii tadpoles and one Ambystoma larvae were collected.

At the time of publication complete field notes for the Md. Rt. 6 group were not available. However, a list of specimens collected are as follows:

On Md. Rt. 6, one Elaphe o. obsoleta, one Lampropeltis g. getulus, a Sceloporus undulatus hyacinthinus, several Carphophis a. amoenus, a Terrapene c. carolina were collected. A Cnemidophorus sexlineatus was observed crossing the road.

On Rt. 235 several Carphophis a. amoenus were collected. The group also sighted one Elaphe o. obsoleta DOR and one Lampropeltis g. getulus DOR.

Summary

The members observed the various habitat preferences of some amphibians and reptiles of southern Maryland. The members also learned the value of good conservation practices in maintaining areas after they are collected. Also learned were techniques in collecting.

A final note that may be of some value to those who intend to drive their automobiles on future field trips, would be to take care in parking along the side of highways. One member of the group parked in a very sandy area at Point Lookout and had a difficult time getting his car back on the road. It is advisable to check the area where you intend to park before you pull completely off the road. It may save the loss of valuable collecting time and a possible towing bill.

David Kramer, 1419 Park Avenue, Baltimore, Maryland 21217.



Description of a New Sub-species of Turtle, From the
Coastal Plain of Georgia*

Zim (1953) in his Check List of North American Reptiles mentioned the occurrence of Arboris arbori from Chetman County. The type specimen is recorded as Arboris arbori Bard and Girnd 1852. Proc. Acad. Nat. Sci. Phila. 12:156--Green Rock, Chetman Co., Georgia. In my Contribution To The Herpetology Of A Roadside Ditch, Snider Swamp, Georgia (1950) I suggested possible occurrence of Arboris in Stockman County some 126 air miles from the type locality. However, this was based only on rumored reports from native peach growers in the area.

In June of 1958 I was presented with a turtle that I assumed was Arboris. The turtle was found crossing State Road 175, 2.8 miles north of Slime Creek. The area is centrally located in the N.E. quarter of the S.W. quarter of sec. 41, T 6W, S 14W, as measured on the Ganesberg North, Georgia topographic map (USGS). In checking the Ganesberg State Museum I learned that the type specimen had become misplaced during the years, and I was left with only Zimm's brief description. With the aid of John Cooper, 1960 chairman of the Snider Township Nation Invitational Turtle Derby, we concluded that this specimen definitely was not of the genus Terrapine. Later, with the assistance of Herbert S. Harris, former president of AHS, the specimen was keyed down to the genus Arboris.

Nevertheless, my single specimen does differ slightly from the original Arboris arbori in the following points: A. the 'S' shaped hairpin striping is not present on the head. B. there is extensive red coloration extending from the nares to the orbits. C. the toe pads were lacking on the 7th and 8th toes. D. the costal and marginals fail to touch. E. this specimen is a male. I therefore propose the species be named:

Arboris arbori belleni, sp. nov.

Holotype: Stockman County Fire Department and Museum (SCFDM) No. 1186, from an area 2.8 miles N. of Slime Creek, Stockman County, Georgia (elevation 10.3 meters); obtained June 20, 1958. Original number 2.

Paratypes: none

Description: The following measurements were taken on May 11, 1958, just prior to preservation--carpace length 107.5mm., carpace width 51mm., head length 23mm., head width 20.5mm., tail length 47.5mm.

Since the currently popular name of Tree Turtle is in such common use it would be most practical to retain this term. I propose

*Supported by the National Science Fundamental Grant (NSFG H-2954) is gratefully acknowledged.

future reference to the western sub-species, in view of the new race, would best be the striped Nose Tree Turtle to prevent confusion with the Red Nosed variety from the coastal plain.

D.S.L., Curator of Herpetology, Snider Swamp Brownie Den #87
Ganesberg, Georgia.

Additions to the Distributional Survey: Maryland and
the District of Columbia - I

Since the publication of the "Distributional Survey: Maryland and the District of Columbia" in Vol. 1, No. 1 of the Bulletin, many new county records have been received. At the end of each year all records received will be published as "Additions to the Distributional Survey". At the end of approximately four years the Distributional Survey will be reprinted with all additions added. The following can be added at this time:

New County Records

Caroline Co.-

Chelydra serpentina - 1 May 1966-0.5 mi. E. Hillsboro on
Md. Rt. (alt.) 404....Nemuras, Harris

Carroll Co.-

Hyla c. crucifer - 12 March 1966-0.5 mi. S. Liberty Dam,
on the W. side of the North Branch of
the Patapsco River.....W. Roeder
Hyla v. versicolor - June 66-0.75 mi. NW. Henryton...D. Saul
Rana s. sylvatica - 12 March 1966-0.5 mi. S. Liberty Dam,
on the W. side of the North Branch of
the Patapsco River.....W. Roeder
Regina s. septemvittata - March 66-Nr. Henryton...A. Norden

Frederick Co.-

Hyla c. crucifer - 9 April 1966-3 mi. S. Thurmont on US Rt.
15.....R. Hahn
Hyla v. versicolor - 20 June 1966-4 mi. S. Thurmont on
US Rt. 15.....R. Hahn
Ambystoma jeffersonianum - 9 April 1966-3 mi. S. Thurmont
on US Rt. 15...W. Roeder, D. Saul,
P. Goodwin, R. Hahn

Garrett Co.-

Heterodon platyrhinos - 1961-Nr. Oakland. The specimen is
presently in the collection of Frostburg
State College and was brought to my
attention by R. Franz.

Somerset Co.-

Ambystoma opacum - 24 April 1966-1 mi. E. Monie on small
road off Md. Rt. 363. On These were larva

which were seined from a pond.....
H. Harris, K. Nemuras
Plethodon c. cinereus - 24 April 1966-3.6 mi. E. Widgeon on Md.
 Rt. 362 and 1 mi. E. Monie on Md. Rt. 363....
H. Harris, K. Nemuras
Scaphiopus h. holbrooki - 28 April 1956. Tindly's Chapel. The
 specimen is preserved in the collection of
 Charles J. Stine (CJS 322).....H. Campbell
 See Herp.12,(4):295-296.
Hyla cinerea - 18 May 1957. W. of Oriole.....C. Reed
 See Herp.16(2): 119-120.
Diadophis p. punctatus/edwardsi - 18 April 1963-1 mi. N of
 junct. of Md. Rt. 362 and US. Rt. 13, on
 US. Rt. 13 (westside)..C. Stine, H. Harris
Chelydra s. serpentina - 24 April 1966-0.4 mi. W. St. Stephen,
 on Md. Rt. 363; Rehobeth, on Md. Rt. 667 at
 Pocomoke River; and on US. Rt. 13, 3 mi. N.W.
 Pocomoke City....K. Nemuras, H. Harris,
T. Sparhawk
Kinosternon s. subrubrum - 24 April 1966-Rehobeth, Junct. Md.
 Rt. 667 and Pocomoke River...H. Harris,
K. Nemuras, T. Sparhawk
Chrysemys p. picta - 24 April 1966-1.8 mi. E. Widgeon on Md. Rt.
 362; at Widgeon on Md. Rt. 362; 0.5 mi. NE
 Hopewell on Md. Rt. 413; Rehobeth on Md. Rt.
 667 at Pocomoke River...K. Nemuras, T. Sparhawk,
H. Harris

Talbot Co.-

Scaphiopus h. holbrooki - 4 Oct. 1928 Easton (See Maryland XVII
 (1) : 7-14).

Wicomico Co.-

Kinosternon s. subrubrum-24 April 1966-0.1 mi. E Vienna on US.
 Rt. 50; 0.25 mi. E. Vienna on US Rt. 50....
K. Nemuras, T. Sparhawk, H. Harris

New State Record

Garrett Co.-

Aneides aeneus - 4 Sept. 1966-"House Rocks", approx. 1.3 mi. SW
 Youghiogheny River Bridge on the Sang Run-
 Cranesville Rd.....H. Harris, D. Lyons

Appalachian Province Records

Alleghany Plateau-Heterodon platyrhinos-see new Garrett Co. Record.

The following two additional records are from
 the eastern edge of the Alleghany Plateau:
 24 April 1966 Dan's Rock; Dan's Mt. Recreation
 area, approx. 3 mi. E. of Lonoconing, Allegany Co.
 (Note: Dan's Rock is located 2 Mi. E. Midland, Dan's Mt., Allegany Co.)

Aneides aeneus - see New State Record: Garrett Co.

Blue Ridge - Ambystoma jeffersonianum - See New Frederick Co. Records
This record extends the range of A. jeffersonianum in Maryland from the Valley and Ridge, across the Great Valley, and on to the eastern edge of the Blue Ridge Section. Specimens are still unknown from the Great Valley.

Herbert S. Harris, Jr., Curator Department Herpetology, Natural History Society of Maryland, Inc., 2643 N. Charles Street, Baltimore, Md. 21218.

Notes On The Herpetology of Panama: Part I

Introduction To The Tropics

My first impression of tropical Panama was one of both awe and excitement. I was unaccustomed to the sights and sounds of jungle collecting, but eagerly looked forward to every adventuresome trip into the field. Soon the strange sights became familiar ones. Sights such as large land crabs dashing around everywhere or occasionally even climbing trees; bats streaking by almost as commonly as birds; or giant toads hopping up and down streets, were just a few.

I arrived in the tropics in May, at which time the dry season was slowly coming to an end. Central America has no winter and summer as we know it in the northeast United States, but merely a dry season and a wet season. The dry season begins in December and lasts through April or May. Then there is an intermittent period before the rainy season gets under full swing, at which time it may rain for a very short period once or twice a day, but remain considerably sunny the rest of the day. The height of the rainy season occurs during October and November. There is very little temperature change during much of the year, and in my first six months there from May to October the daily temperature was seldom far from 88° F.

From May to October in Panama's Canal Zone I saw only two live snakes, catching one. I arrived on May 8, and I

didn't catch my first snake until September 4, (although one was missed in late June and several DOR specimens seen within this period). All toll, from May 8, to October 8, one live snake was caught, one was missed and five DOR specimens were seen.

On the Pacific side of the Canal Zone, in the vicinity of Panama City and Balboa, amphibians and reptiles abound in a variety of habitats. These include sandy beaches, mangrove areas, jungle streams, rivers, fresh-water ponds and rolling hills. The herpetofauna of this area includes such typical species as Bufo marinus, Iguana iguana, Gonatodes fuscus, and Pseudemys ornata.



Fig. 1. Canal Zone,
western coast.

Fig. 2. Mangrove
area in the
western canal
zone.



Bufo marinus

The Marine Toad is identified by the presence of all head ridges (supraocular, supratympanic, occipital) and its enormous parotoid, in addition of course to its large size. This is probably the most common toad of the western Canal Zone region, where it seems to frequent populated areas to a great extent. Dunn (1931-1933) reported Bufo marinus rare on Barro Colorado Island in the central Canal Zone, but fairly common in Panama's El Valle De Anton.



Fig.3. Bufo marinus, Canal Zone

Most of my specimens were seen at night, though they would also turn up in drainage ditches during the day. I have found specimens on rocks along jungle streams during the daylight hours, and others in the wet grass on a golf course. On one occasion I encountered a specimen at mid-day upon a large boulder along the seashore. At Howard Air Force Base I have seen a number of these toads down in cement crevices, where they no doubt spend most of the day, as well as hopping around on the ground floor of the barracks at night. On the night of August 26, several Marine Toads were encountered in amplexus in a large drainage ditch at Fort Kobbe.

Iguana iguana

The Green Iguana is a common species of Canal Zone lizard, and my first specimens were recorded on May 14, when two small green individuals were encountered at Kobbe Beach. The first fled across a narrow inlet and easily escaped (a feat more common with the Basilisk). The second lizard was sunning on a high branch along the beach, and managing to approach it off guard, I quickly grabbed it. Most adult specimens seen were brownish in color. Although on September 4, I saw a very large (full-grown) bright green Iguana iguana up in a tree on Howard Air Force Base.

Iguanas can sometimes be found in the market area of Panama City, where they are brought alive to be sold for food.



Fig. 4. Iguana iguana, Kobbe Beach, Canal Zone.

Gonatodes fuscus

The Yellow-headed Gecko may be encountered commonly during the day, as well as at night. I have seen them in trees, on rocks along the beach, on logs in the jungle, along drainage ditches, and even inside of buildings. It is a very delicate-skinned lizard and should not be handled roughly. The toes do not consist of expanded pads, a feature typical of most other geckos. The pupils of the eyes are round.

The sexes look like almost entirely two different species. The female is of a brownish hue with a mottled pattern, while the adult male is black with a yellow head and specks of blue. Young males have a reddish colored head. The above mentioned was from literature stating males have yellow heads. All I have examined have had reddish colored heads.



Fig. 5. Gonatodes fuscus, male From Fort Kobbe, Canal Zone

Pseudemys ornata

The general appearance of the Central American Red-ear is similar to that of Pseudemys scripta elegans, though the shell pattern differs and the red blotch of the ear area is lacking. I have seen very large individuals sunning on logs in the lake areas of the central Canal Zone, and others floating down the Rio Cocoli River in the western Canal Zone.

Specimens collected from June to October 1966, are listed below:

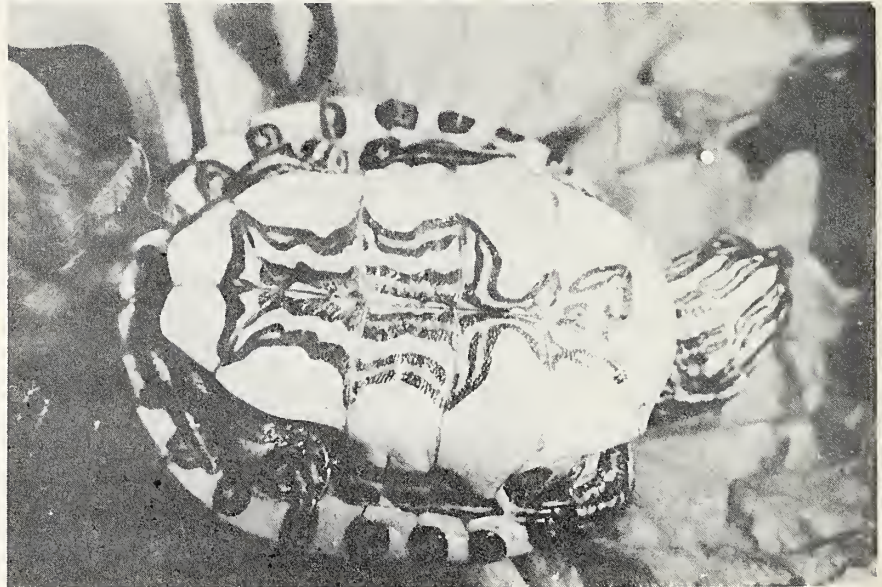


Fig. 6. Plastron of Pseudemys ornata from Cocoli, Canal Zone.

<u>Date</u>	<u>Locality</u>	<u>Time</u>	<u>Length</u>
June 19	Cocoli, Canal Zone	2:30 p.m.	42mm (1.65 inches)
June 24	Cocoli, Canal Zone	7:30 p.m.	37mm (1.46 inches)
June 26	Cocoli, Canal Zone	12:15 p.m.	262mm (10.32 inches)
June 26	Cocoli, Canal Zone	12:45 p.m.	48mm (1.89 inches)
July 2	Cocoli, Canal Zone	-	43mm (1.69 inches)
July 29	Cocoli, Canal Zone	6:00 p.m.	40mm (1.56 inches)
July 29	Cocoli, Canal Zone	6:00 p.m.	135mm (5.32 inches)
Sept. 4	Cocoli, Canal Zone	5:30 p.m.	70mm (2.76 inches)
Oct. 1	Cocoli, Canal Zone	5:45 p.m.	120mm (4.74 inches)

The June 19 specimen was found in a rain puddle near the Rio Cocoli, while the June 24 individual was found in the same area after dark along a dirt road. The larger (June 26) turtle was found in the weeds near a pond and the smaller specimen was found in a shallow ditch. The July 2 and July 29 specimens were found in the water along the marshy edge of a pond, while the September 4 turtle was taken in the weeds at the pond's edge. The one collected on October 1, was found in the water at the marshy edge of a pond.

Included in each article of this series for members who are interested, will be a section of Dunn's key on frogs of the Canal Zone region. The first genus covered will be the toads, Bufo.

Key to Canal Zone Bufo

I. Sternum cartilaginous; no vomerine or maxillary teeth; terminal phalanges pointed; toes short, mostly enveloped in web; a parotoid gland; eggs laid in water, in strings.

A. No head ridges.....haematiticus.
AA. Head ridges present.

B. Ridges present only around eye.....granulosus.

BB. All head ridges present (supraocular, supratympanic, occipital).

C. Parotoid small.

D. Occipital ridges not prominent; warts not spiny..typhonius.

DD. Occipital ridges prominent; warts spiny...coniferus.

CC. Parotoid enormous.....marinus.

Literature Cited

Dunn, E. R.

1931 The Amphibians of Barro Colorado Island. Occasional Papers of the Boston Society of Natural History, Vol. 5, p. 403-421.

1933 Amphibians and Reptiles from El Valle De Anton, Panama. Occasional Papers of the Boston Society of Natural History, Vol. 8, p. 65-79.

Ken Nemuras, 605 A.C.S., Box 3012-161, Howard AFB, Canal Zone.



Maryland Herpetological Society

Classified Paper

Number 3, November, 1966

Editor: Richard Saul

For Sale: The following turtles for the serious collector; Clemmys
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grandis (4 inches), Platyemys (6 in.). Others available. Write:
Fred Schlauch, Apartment #3, 2nd floor, 10 Mahland Place, Long Island,
New York.

For Sale: Milk Snakes, King Snakes, Black Rat Snakes, Gopher Snakes
and Western lizards. Many other available. Contact: David Saul,
1404 Haubert Street, Baltimore, Maryland.

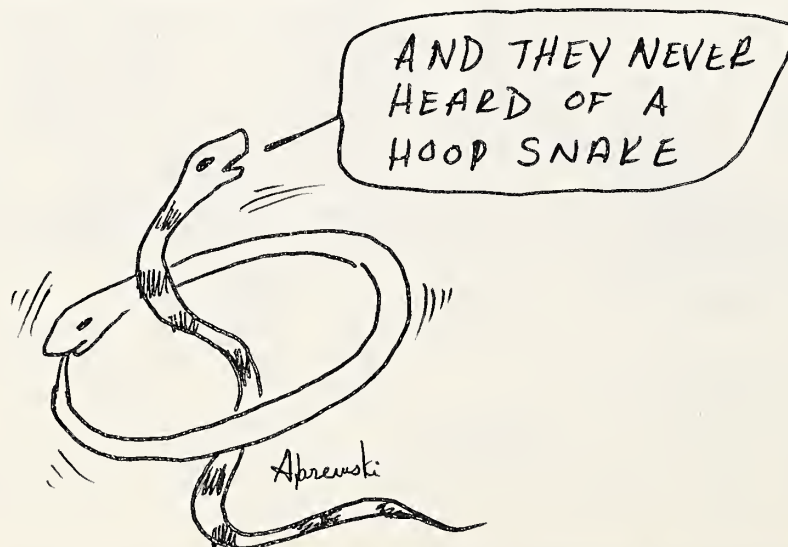
For Sale or Trade: Desert Tortoises and Tiger Salamanders. Other
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* denotes photograph

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The Cover: The Northern Spring Peeper, Hyla c. crucifer. This
specimen is from Patapsco State Park, Howard Co., Md.
Photograph by Dr. Robert S. Simmons.

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Notes on the Long-tailed Salamander, *Eurycea longicauda longicauda*

(Green), in Maryland Caves

The Long-tailed Salamander, *Eurycea longicauda longicauda* (Green), which is known only from the Appalachian and Piedmont Provinces of Maryland and has been recorded from every county within these areas (Cooper, 1965), recently has received much attention. Numerous workers (Mohr, 1943; Hutchison, 1956; Cooper, 1960; Franz, 1964; Anderson and Martino, 1966 and others) have noted several aspects of its natural history but to date only Anderson and Martino have attempted to collect the facts and put them into some order. The purpose of this paper is to comment on previous investigations and to present new information concerning reproduction in *Eurycea l. longicauda*.

Reproductive Cycle

The activity cycle of the Long-tailed Salamander, appears to consist of three time periods: 1) non reproductive summer period, 2) regular migration in late summer and fall and again in the spring, 3) winter breeding period (Anderson and Martino, 1966). The summer activity consists of surface feeding, while the winter period is primarily the time for reproduction. Apparently, mine tunnels, limestone caves and fissures (microcaverns) are used as winter retreats. Several workers have observed an annual autumn migration into underground quarters. Mohr (1944) found large numbers of *E. l. longicauda* entering a Pennsylvanian mine in July, August and September. This activity reached two peaks, one in October and the other in April. A lull was noted between the two peaks, possibly due to the salamanders retreating into deeper crevices. Anderson and Martino noted the disappearance of the Long-tailed Salamander from certain New Jersey ponds in October. The adults would reappear in late April while the small larvae became apparent in late March. Similar observations were made by Mohr (1944) and the author. While conducting a survey of Maryland cave animals, this phenomena was observed in two Washington County caves, Dam No. 4 and Sechrompf. In the first cave, the number of these salamanders increased from August through November, 1964. In July 1964, many Long-tailed Salamanders were seen, marked (toe clipped), and released in the adjacent C. and O. Canal. On 23 November 1964 twenty-three salamanders (3 with clipped toes) and a cluster of five eggs was found in the rear of the cave. On 30 August 1966 seventeen salamanders (7 males and 10 females) were observed at Sechrompf Cave. A later visit was fruitless. There is no apparent water in the cave, but below the cave entrance, flowing from an opening at the base of the hill, is a large spring which feeds two large water cress ponds. It is conceivable that the salamanders retreat through small crevices into this lower inaccessible water course.

Mating

Little is known concerning the courtship and mating. Cooper (1960) observed some courtship activities in an abandoned Bare Hills chrome mine, Baltimore County on 18 October 1955. The antics consisted of the rubbing of the male's head around the anal region of the female, as well as chasing by the male, and rubbing of noses. Possibly, mating is stimulated by the migration of these salamanders into a subterranean environment.

Eggs

The egg-laying period of E. l. longicauda probably extends throughout most of the fall and winter months. Eggs, apparently recently deposited, have been collected in November (Franz, 1964) and January (Mohr, 1943); recently hatched larvae have been found from December through March. According to Mohr, the incubation period is extremely long, probably 85 to 90 days. Eggs that were first seen on 2 January hatched on 14 March. This indicates that the eggs of the 3 December larvae at Dam No. 4 Cave were deposited in September. A large female from Patapsco State Park, Howard County, collected 25 September 1965 was found to contain large ovarian eggs (2mm.). Gravid females were found in the Bare Hills mine tunnel on 16 November 1947 (Cooper, 1960).

Eggs have been found only twice and both times from underground sources. One was a mine tunnel in southern Pennsylvania, and the other a limestone cave in Washington County, Maryland. Mohr (1943) discovered eggs which were attached to submerged rocks and boards; Franz (1964) found them fixed to the ceiling of a cave, two feet above the water in the air space (Fig. 1.). These last eggs, in any other situation, would have probably not survived due to dehydration, but since the relative humidity of limestone caves is 100% (Davies, 1950) the eggs were relatively safe from desiccation. Since this cave floods during the winter, survival would be insured.

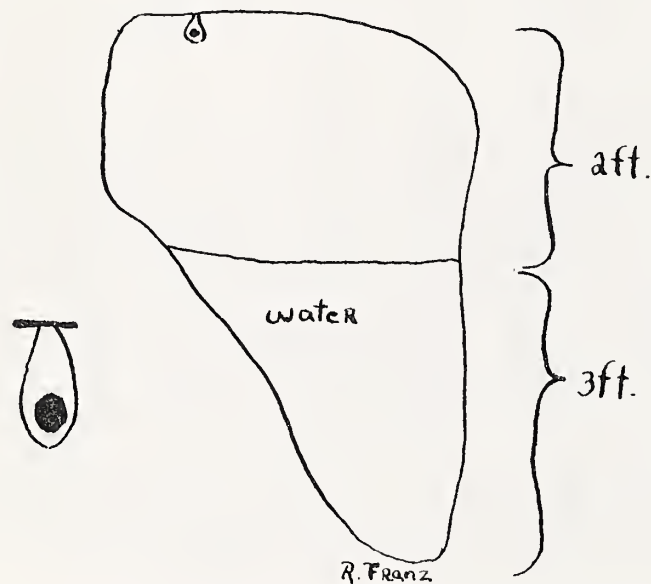


Fig. 1 - Diagram showing the position of the five eggs in the stream passage of Dam No. 4 Cave, Washington County, Maryland.

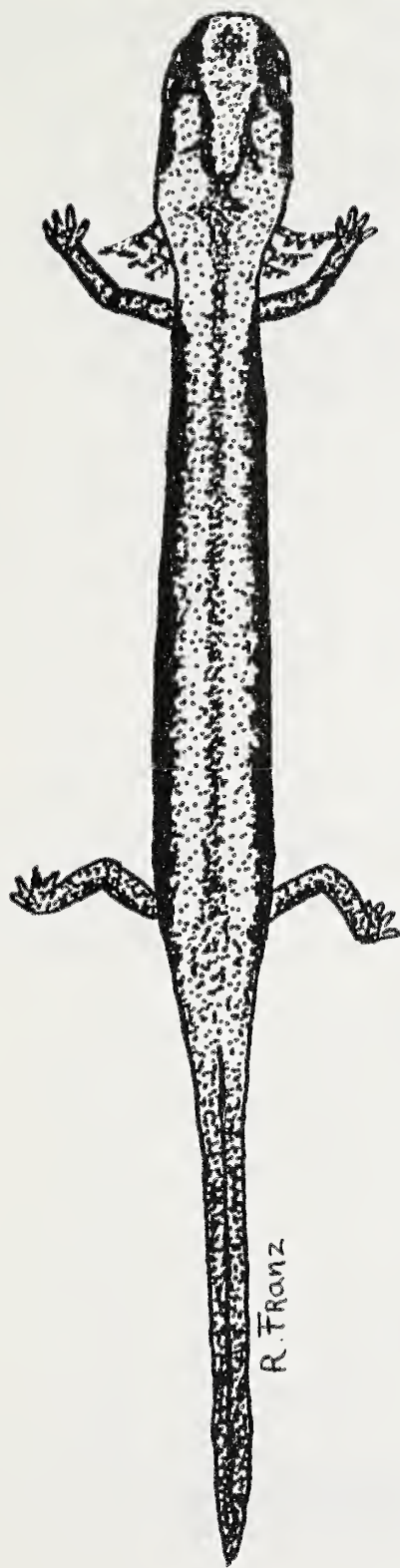


Fig. 2 - Dorsal view of a recently hatched larva of Eurycea l. longicauda which was collected on 31 January 1965 at Dam No. 4 Cave. (18mm. total length)

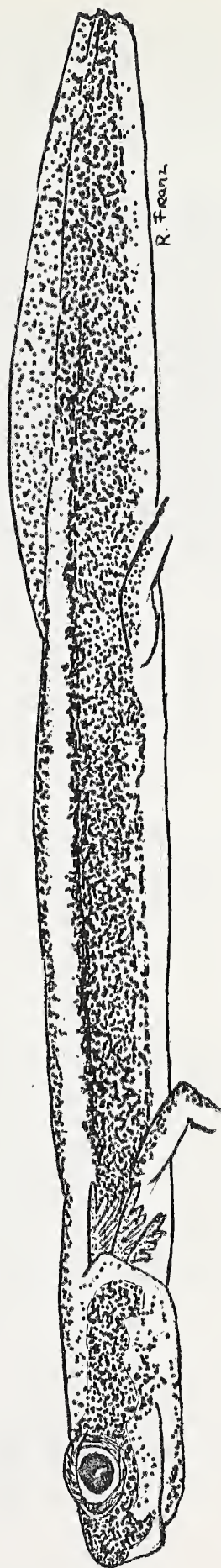


Fig. 3 - Side view of a recently hatched larva of Eurycea l. longicauda which was collected on 3 December 1965 at Dam No. 4 Cave. (20 mm. total length)

The yellowish eggs of the Long-tailed Salamander measure 2.5 to 3.0 mm before segmentation, whereas the egg and its clear membranes measure 8 mm. The eggs are adhesive at the point of attachment.

Larvae

The recently hatched larva resembles a small Eurycea bislineata, having a light dorsal stripe and darker sides. This cream-colored dorsal stripe extends to a point just beyond the hind legs. There is a thin black line, corresponding to the spines of the vertebrae, which extends from the head to an area behind the legs. At this point it becomes diffused with the darker pigment making up the last two-thirds of the sharply keeled tail (Figs. 2, 3). The sides contain a concentration of dark pigment. The ventral surface is immaculate, with the exception of black pigment on the lower jaw (Fig. 4), and a few scattered golden flecks on the belly. Mohr (1943) gives lengths of 17, 18.5 and 19 mm for hatching larvae. The larvae from the Washington County cave measured 18, 18.5, 19.5 and 20 mm. Color changes were noted in the small larvae.

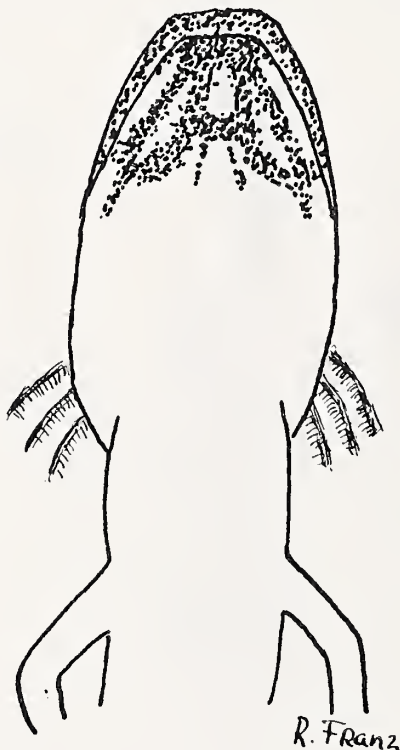


Fig. 4 - Ventral view showing pigmentation of the lower jaw. (Same individual as in Fig. 3)

While the salamander larvae were in the caves, their bodies were extremely darkened but when placed in the light, their bodies soon appeared to lighten. Several larvae were kept alive on a diet of daphnia and tubifex worms. Growth was slow with the head enlarging first. Recently hatched larvae were found in John Brown's Cave and Shephardstown Caves, West Virginia on 20 March 1966. Both of these caves are located on the Potomac River and hence are included here.

The mature transforming larvae resemble the recently hatched individuals except that there is a yellow, instead of a cream-colored stripe extending from the head to the tip of the tail. Also, the thin black line now continues to the tip. The sides are mottled with dark gray and pale lemon. The gills, if present, are spotted with black pigment. Fifteen transforming larvae, collected at Deep Creek Lake in Garrett County, Maryland, had lengths of 33 mm to 44 mm. Apparently some larvae take more than one year to transform. Bishop (1947) mentions that larvae attain a length of 60 mm. Several small larvae (19-24 mm) and one 51 mm larva were collected in the Shephardstown Caves on 20 March 1966. It is my opinion that Bishop's 60 mm specimens and my 51 mm specimen represent larvae in their second year of development. Anderson and Martino (1966) mention finding first year larvae (51 mm) transforming in the New Jersey ponds. Since this lentic habitat occurs above ground, there is a much larger food supply than in a subterranean situation. Therefore the larvae can attain a larger size more quickly.

On 5 July 1959, Franz and Harris (1965) observed a large metamorphic aggregation at Deep Creek Lake. Within a few hours, hundreds of E. l. longicauda larvae transformed and moved onto the drier portions of the stony beach.

Conclusions

1. The activity cycle consists of three periods 1.) summer feeding, 2.) fall and spring migration, 3.) winter breeding.
2. These salamanders use mine tunnels, limestone caves and rock fissures for winter retreats.
3. Egg laying period extends from September through January.
4. Period of hatching is approximately 85-90 days.
5. Eggs are usually deposited in the water and attached to some object.
6. The egg has a large quantity of jelly surrounding it.
7. Larvae are approximately 18 or 19 mm in length at hatching and are found as early as December.
8. Growth is slow and in some cases larvae may take two years to fully develop.
9. Larvae will transform when they are 33 to 60 mm in length (usually in June or early July).
10. Occasionally many will reach larval maturity at the same time and will transform in great numbers.

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L. Richard Franz, Jr., Parkville Senior High School, Baltimore, Maryland.

A Note on the Concept of Subspecies *

by Dr. James A. Peters
U.S. National Museum

In the course of collecting reptiles and amphibians in Virginia and elsewhere, any collector is likely to find within the range of one subspecies individuals that answer the description of a different subspecies. On the basis of such individuals there is a strong inclination to add the different subspecies to the faunal list of a state; to alter the described range of the subspecies; or to decide that the two subspecies are not truly different. Actually, none of these alternatives can be considered valid unless some additional investigations are made. This is a result of the basic methods used by the original describer in defining the subspecies.

First and foremost in the mind of the describer is the fact that he is working with populations, that is, groups of individual specimens. He makes an effort to examine as many specimens as he can obtain from personal collecting and from museums, with the hope of seeing material from all parts of the species range. He tabulates a large number of characteristics, and then compares sample with sample, often using statistical methods to determine whether they come from the same or different populations, or from the same or different subspecies.

When a scientist discovers that two groups of populations have a large number of characteristics in common, but differ from each other in one or more additional characteristics, he will quite often distinguish between these two groups of populations by assigning each a subspecific name. The differences need not be absolute (as, for example, one group all red and the other group all green), but often are only a matter of degree (as when one subspecies of snake has 131 to 141 ventrals, another 140 to 150). Even when absolute, the differences may not be exclusive. Thus, 8 out of 10 individuals in subspecies "A" might be red, with the rest green, while 8 out of ten in subspecies "B" are green with the rest red. Some scientists have accepted what is known as the 75 percent rule, which can be interpreted to say that only 75 percent of subspecies "A" need to be distinguishable from 75 percent of subspecies "B" for the subspecies to be recognized as validly different. In such a case, it should be clear that about 1 in 4 individuals collected in the range of one subspecies may look just like the members of the other subspecies. The occurrence, then, of individuals found in a local area but appearing to belong to a foreign subspecies is not grounds, by itself, for any change in the status of the names in that area.

Scientists, of course, are not infallible, and they can make errors in the definitions of subspecies. Or, more properly, insufficient material from all parts of the range of the species makes it very difficult to be sure that the range of each subspecies is clearly delimited, that all valid subspecies have been recognized, or that all differences utilized will survive the test of larger sample size.

* Reprinted from the VHS Bulletin No. 45, October-November 1965, with the Virginia Herpetological Society's and the author's permission.

To challenge any of these things, however, the challenger must recheck the original material as well as any new population samples accumulated since the revision was published. If he does not wish to do this, he must accept the earlier decisions of the investigator who did do it.

It would be highly unscientific to question a subspecies definition, or the range limits ascribed to that subspecies, on the basis of a single individual or sample drawn from cursory collecting. This can be done only after a thorough review of the pertinent literature and available collections.

In addition, the biological basis of the subspecies should always be taken into consideration. To use the term "subspecies" is to imply that the populations involved are all part of a single species, and thus have common access to a continuous gene pool. This communality of genes, accompanied by the assumption or demonstration of interfertility and gene flow, means that the similarities between subspecies will be much more numerous than the differences. Occasionally just by chance, individuals within one population might be expected to have gene combinations that produce characteristics of a related subspecies. This is, in fact, predictable, if the concept of subspecies is valid.

Finally, it should be mentioned that there are a number of biologists who feel that the subspecies concept tends to obscure more knowledge of the biology of the species than it reveals, and would advocate dispensing with the category entirely. While their ideas and arguments have not yet persuaded or perhaps even reached the majority of zoologists working with subspecies, the very existence of such ideas should be in itself a cautionary reminder to the collector who views subspecies as clear-cut, well-defined entities unchallenged and unchallengeable.

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Notes on the Herpetology of Panama: Part 2

The Family Hylidae

The herpetofauna of Panama includes an interesting variety of the Hylid frogs, commonly known as the tree frogs. They abound in a wide variety of habitats, colors, and size. While many individuals call more frequently during the rainy season, some do call in dry weather. They may call from the ground, or from leaves high in the trees.

In some respects, stalking tree frogs in Panama is no different than in the United States. Pushing through the reeds at the edge of a marsh, you are drawn closer and closer to the creature by its call, standing motionless when the frog suddenly stops calling, and proceeding again when it resumes. After a short game of "hide and seek", the voice in the night soon leads you to its origin. An active vocal pouch, expanding and contracting is now visible in the beam of your flashlight. The specimen is secured and the search for others continued, this time in a nearby, wet, grassy situation. (A scene remindful of collecting Grass Frogs in the Southeast U.S.).

Other frogs and habitats are not so familiar, and a collector might find anything from an enormous tree frog of extra-large dimensions, to one with a harmful skin secretion. The calls, too, will be unfamiliar at first. There will be some specimens which actually do very little calling at all and are often found merely by chance.

The family Hylidae contains several genera. The following list was prepared by C. W. Myers (personal communication) and includes those species which might be expected in central Panama and surrounding areas (Fig. 1). Names in parentheses are synonymous.

Genus Hyla

1. Hyla microcephala
2. Hyla ebraccata
3. Hyla staufferi (Hyla altae)
4. Hyla rubra - VERY RARE
5. Hyla phlebodes (Hyla underwoodi)
6. Hyla boulengeri
7. Hyla foliamorta
8. Hyla crepitans
9. Hyla rosenbergi (Hyla maxima)
10. Hyla rufitela (Hyla albomarginata)
11. Hyla elaeochroa

Genus Gastrotheca

12. Gastrotheca ceratophrys (formerly Hyla ceratophrys) - Scarce

Genus Cerathyla

13. Cerathyla panamensis (formerly Hemiphractus panamensis) - Scarce

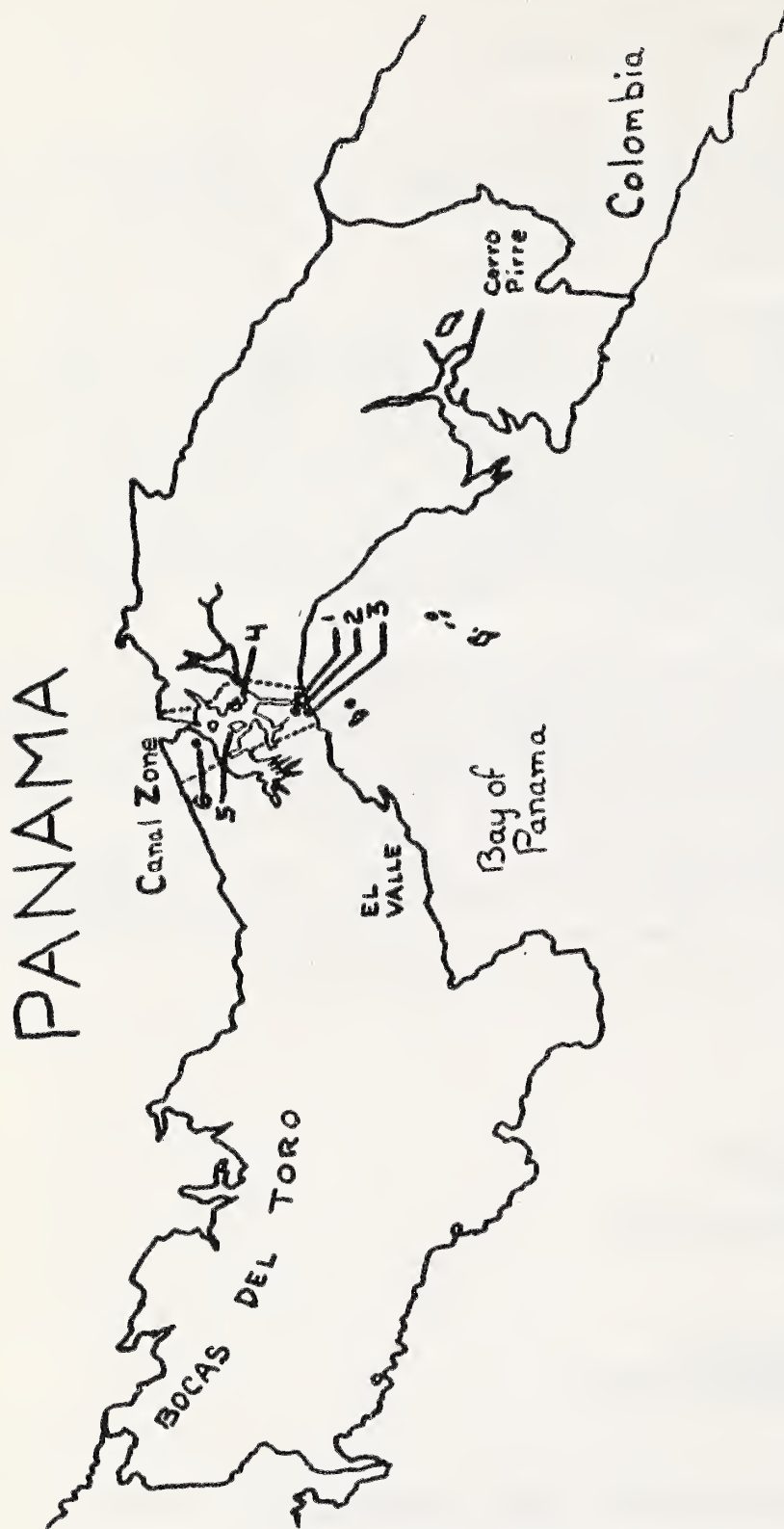


Fig. 1 - Map of Panama showing localities mentioned in the text. Numbered areas are: 1. Balboa, Canal Zone; 2. Cocoli, Canal Zone; 3. Fort Kobbe, Canal Zone; 4. Frijoles, Canal Zone; 5. Barro Colorado Island; 6. Gatun, Canal Zone.

Genus Phrynohyas

14. Phrynohyas venulosa (formerly Hyla venulosa)

Genus Phyllomedusa (formerly Agalychnis)

15. Phyllomedusa calcarifer - Rare
16. Phyllomedusa spurrelli - Scarce
17. Phyllomedusa lemur - Scarce
18. Phyllomedusa callidryas -

Genus Smilisca

19. Smilisca phaeota (formerly Hyla phaeota, Hyla baudinii, Hyla dolomedes)
20. Smilisca sila (formerly Hyla gabbii, Hyla sordida)

Hyla staufferi

One specimen, a male, was recorded by Dunn (1933) at El Valle De Anton, Panama. All of my specimens during 1966 were taken near Cocoli, Canal Zone. The first (Fig. 2) were collected on 2 October. They were heard calling in two separate patches of reeds around a large pond. Hyla microcephala were widespread around the entire pond but the staufferi were heard in only two small areas. At one location, five specimens were taken on the stalks and reeds (Fig. 3). Several specimens were seen or heard again on 2 November. This time they were distributed around the border of the pond (Fig. 4). A final individual was recorded on 12 November.

Hyla microcephala

Dunn reported this small species common at El Valle De Anton, Panama. In the Canal Zone he reported it from Frijoles, Gatun, and Balboa. It is a striped tree frog (Fig. 5) with half-webbed toes, and occupies a variety



Fig. 2 -Hyla staufferi calling in natural habitat, Cocoli, Canal Zone.



Fig. 3 - Habitat of Hyla staufferi and Hyla microcephala,
reeds along edge of pond.



Fig. 4 - Habitat of Hyla staufferi and
Hyla microcephala, a large pond.

of habitats. I have found them on a golf course, in a flat, flooded grassy area, and on reeds and stalks surrounding marshes. They often start calling earlier in the night than most other tree frogs. I have heard this species as early as 5:30 p.m. on a rainy day. The following are my notes on Hyla microcephala for 1966, giving the various dates they were recorded:

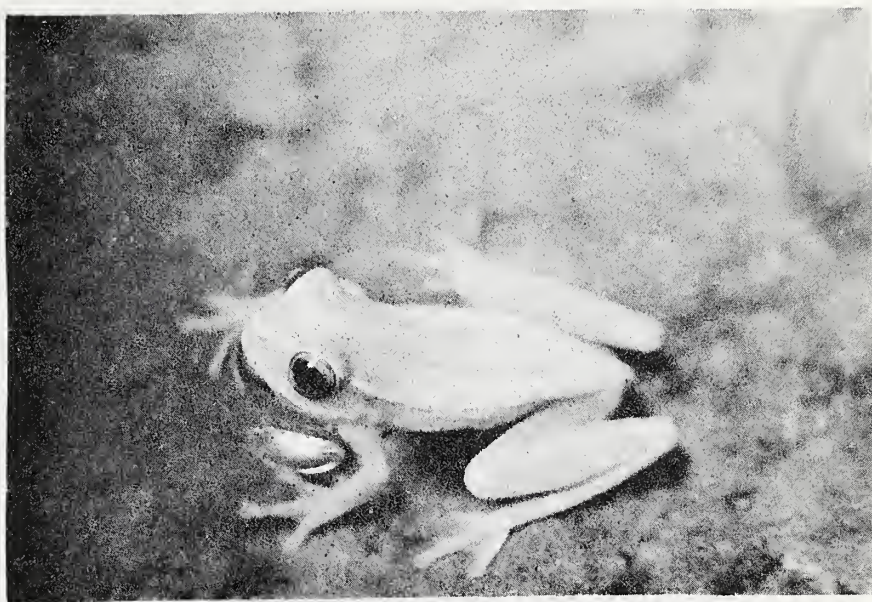


Fig. 5 - Hyla microcephala in natural habitat, Cocoli, Canal Zone.

<u>Date</u>	<u>Locality</u>	<u>Notes</u>
26 August	Fort Kobbe, Canal Zone	Several specimens observed or heard calling.
4 September	Cocoli, Canal Zone	Two specimens collected
10 September	Cocoli, Canal Zone	Four specimens collected
1 October	Cocoli, Canal Zone	Twelve specimens found
2 October	Cocoli, Canal Zone	Three specimens collected
2 November	Cocoli, Canal Zone	One specimen collected
4 December	Fort Kobbe, Canal Zone	Two specimens collected
18 December	Cocoli, Canal Zone	Several specimens collected

Hyla ebraccata

Five specimens of this beautiful little tree frog (Fig. 6) were collected during 1966 near Cocoli, Canal Zone. The first two were taken on 15 October. Both individuals were plain yellow in color with a dark brown band along the face at eye level. Another specimen of this form was taken on 2 November. Two individuals profusely marbled with yellow and brown, which is another variation of this species, were taken on 12 November. All were calling from a height of several feet, in young trees around a jungle pond (Fig. 7).



Fig. 6 - Hyla ebraccata (mottled form) from Cocoli, Canal Zone.



Fig. 7 - Habitat of Hyla ebraccata.

Cerathyla panamensis

This is probably the most unusual of the Hyliid frogs (Fig. 8). It is weird both in appearance and habits. The pattern varies considerably from blotched and spotted to almost uniform, but the frog is easily recognized by the horn-shaped appearance of the head (hence, it is known commonly as the Horned Frog). The tongue is a bright yellowish orange, an uncommon feature in frogs.

Records for this species range throughout the length of Panama in scattered locations. It is, however, found mainly in elevated areas (with recorded elevations being 2460-5084 ft.) and absent in the low country of the Canal Zone, suggesting a distributional break. Localities for Panama include the mountains of Bocas del Toro Province, Rio Changuena drainage (near the Costa Rican border), the community of Altos de Pacora in Panama Province, Signal Loma in eastern Colon Province, and Cerro Pirre (near the Colombian border) in Darien Province.

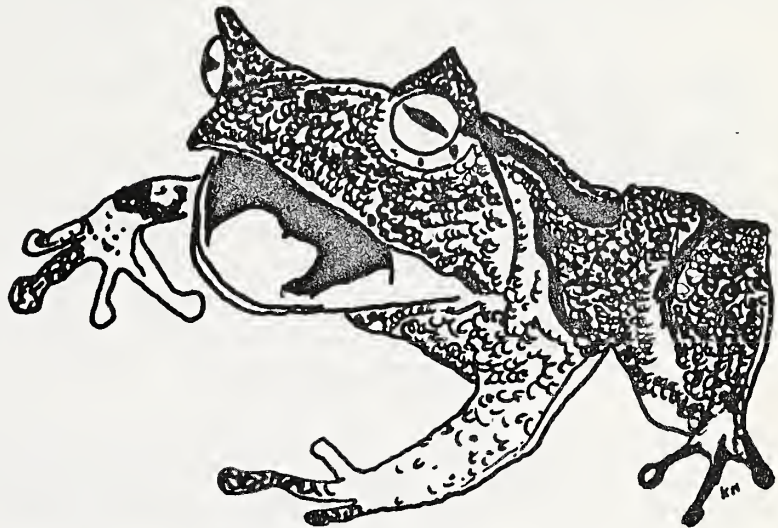


Fig. 8 - Cerathyla panamensis

Remarks by Myers (1966) on the behavior of this species follows: "The individuals obtained by me, at Altos de Pacora and Cerro Pirre, exhibited remarkable defense behavior. These frogs made no attempt to escape unless unduly prodded. Rather, when picked up or tapped on the snout, they gaped the mouth and sometimes slightly arched the body by throwing the head up and back. The effect was striking owing to a bright, yellowish orange tongue (yellow in one), as well as to the large mouth and weird head shape. These frogs varied individually in the extent of this behavior and in the number of times it could be induced. Thus, one individual opened the mouth only slightly and for only a few seconds at a time, whereas the others gaped widely, for periods ranging from several seconds to a minute depending in part on the degree of stimulus. One individual could not be induced to perform after the first time, several quit after the first few days, and two gave the mouth display, upon occasional demand, for several weeks after capture. Prodding, foot-pinching, and snout-tapping were the stimuli used; also the display was evoked by the jostling of other individuals of Cerathyla in the same bag. They leaped away, if not restrained, after varying amounts of stimulation. Several were notably insistent on facing the source of their torment, quickly swinging the opened mouth

about when worried from a new quarter. The display is not all bluff, for several readily bit any object placed close to the mouth and one even fastened its jaws around the head of a neighboring Cerathyla. By offering a finger to the first Cerathyla captured, I was made painfully aware of the two sharp odontoids (on front of lower jaw) that proved capable of piercing human flesh; one must wait patiently for the grip to be released, or else pry apart the jaws." ¹

Hylidae of Barro Colorado Island

From Barro Colorado Island in the lake region of the central Canal Zone, eight Hylidae are known. These are:

1. Hyla boulengeri
2. Hyla phlebodes
3. Hyla rufitela
4. Phyllomedusa calcarifer
5. Phyllomedusa callidryas
6. Phyllomedusa spurrelli
7. Smilisca phaeota
8. Smilisca silva

Hyla boulengeri

A recorded date available from Barro Colorado Island is 22 November (rainy season) from four calling males taken by Dunn (1931) on floating grass patches. The very catlike note is "cree".

Hyla phlebodes

Recorded dates available include the start of rainy season (22 July) and end of rainy season (28 November and 2 December). The 28 November record is of four specimens, including a mated pair. Note is "ik lik".

Hyla rufitela

Heard calling on dates of 1 August, 3 December, 9 December and 21 December (rainy season). Note reported to be a loud explosive "bop".

Phyllomedusa calcarifer

A single record is from Barro Colorado Island, the recorded date being 18 December. A rare and beautiful tree frog. There are two individual records from Ecuador and Colombia.

Phyllomedusa callidryas

Apparently this is not as uncommon as the other species of

¹ From: The Distribution and Behavior of a Tropical Horned Frog, Cerathyla panamensis Stejneger by Charles W. Myers. Quoted with permission of the author.

Phyllomedusa on Barro Colorado Island. It was heard calling in a colony on dates of 19 July, 25 July, 18 December and 19 December from six to eight feet up in the trees. Note is "tlock".

Phyllomedusa spurrelli

Recorded dates available are 22 July and 15 November.

Smilisca phaeota

Dates recorded are 10 February (dry season) and 16 July (early wet season). This species is not too uncommon. Call is a loud croak.

Smilisca sila

Dunn found this species active in dry season or on nights when it did not rain. Recorded calling before a rain and stopping when the rain began. Call is "awk ek ek". Dates available are 24 November, 29 November, 2 December, 3 December, 5 December, 11 December, 12 December, 13 December, 9 February, 10 February and 15 February. None were seen or heard calling in July or August. Calling stations are rock slopes at the edge of stream beds, hence the preference for dry weather (Rainy weather would produce heavy water flow in the streams and along their calling stations.).

Key to Some of the Canal Zone Hylidae

The following key is taken from Dunn (1931) and is a composite form with recent name changes made. The original key included Hyla and Agalychnis, but the latter has been changed to Phyllomedusa and Hyla has been broken down into Hyla, Gastrotheca, Phrynohyas and Smilisca.

Family Hylidae: Shoulder girdle arciferous; digits with an intercalary cartilage; disks well developed and toes webbed in regions.

- I. Eyes lateral; pupil horizontal, terminal phalanges claw-shaped; eggs laid in water.
 - A. Vomerine teeth in two groups forming an arch; fingers $\frac{1}{2}$ webbed; grayish green; webs red; medium sized.....Hyla rufitela
 - AA. Vomerine teeth in two small groups between choanae.
 - B. Fingers free, or with merely a trace of web.
 - C. A projecting flap on eyelid; large; crossbarred..Gastrotheca ceratophrys
 - CC. No projecting flap on eyelid.
 - D. Snout short and blunt; tiny; five stripes; toes half webbed.....Hyla microcephala
 - DD. Snout long and flat; medium sized.
 - E. Smooth above; no black spots on thigh and groin.....Hyla elaeochroa

- EE. Rugose above; black spots present on thigh and groin.....Hyla boulengeri
- BB. Fingers at least $\frac{3}{4}$ webbed.
- C. Fingers about $\frac{1}{4}$ webbed.
- D. Small frogs; toes not webbed to disks of 3 and 5; thighs almost without pigment; a network of dark lines aboveHyla phlebodes
- DD. Medium species; toes webbed to disks of 3 and 4; thighs pigmented; a black band on sides of face..Smilisca phaeota
- CC. Fingers about $\frac{1}{2}$ webbed; medium species.
- D. Smooth above; brownish, with darker marbling; green dots in groin and on hind side of thigh.....Smilisca sila
- DD. Warty above; very gaudy marbling.....Phrynohyas venulosa
- II. Eyes lateral, pupil vertical; terminal phalanges claw-shaped; eggs laid above water; a tadpole stage.
- A. Fingers $\frac{1}{2}$ webbed; medium sized.
- B. Green with white bars on side; concealed surfaces orangePhyllomedusa callidryas
- BB. Green with concealed surfaces orange with black barsPhyllomedusa calcarifer
- AA. Fingers entirely webbed; green with occasional white warts above; concealed surfaces orange; large..Phyllomedusa spurrelli

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- K. T. Nemuras, 605 A.C.S., Box 3012-161, Howard Air Force Base, Canal Zone.

A NEW COUNTY RECORD FOR JEFFERSON'S SALAMANDER IN MARYLAND

by

Charles J. Stine and Robert S. Simmons

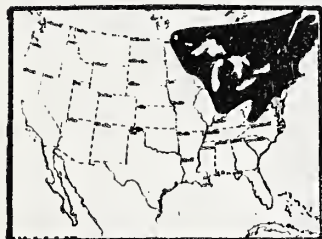
Photographs by Charles J. Stine

Ambystoma jeffersonianum (Green) has been previously known by preserved specimens from only Allegany County in Maryland.

The report of jeffersonianum from Plummer's Island, Montgomery County by Brady (1937, Proc. Biol. Soc. Washington, 50:137) must be considered hypothetical due to lack of preserved specimens.

Dr. M. Graham Netting reported in the July 1946 issue of Maryland, adult specimens of this species secured by Mr. Leonard Llewellyn on April 3, 1937 and March 12 and 19, 1938 at Carlos, situated near the western extremity of Allegany County.

On April 19, 1952, Mr. James A. Fowler collected a series of larvae in a pond 0.4 mile south of Route 40 on the Ernstville Rd. 15.3 miles west of Hagerstown in Washington County. The larvae were those of Ambystoma opacum and an unidentified species. Egg



General range
of species



Locality records for A. jeffersonianum
in Maryland

Reprinted from the Maryland Naturalist, Vol. XXII, Nos. 3 and 4, 1952, with the authors' permission.

masses of Ambystoma maculatum were also present. Mr. Fowler preserved all the smaller unidentified larvae and expressed the opinion they might be larvae of Ambystoma jeffersonianum.

On May 17, 1952, the senior author and Howard W. Campbell collected a series of larvae from the same pond. The larger larvae transformed to juvenile A. opacum as anticipated and one of the smaller group transformed to a juvenile A. jeffersonianum when forced by laboratory induced anhydrous conditions.

On June 17, 1952, the authors and Howard W. Campbell obtained a fine series of Jefferson's larvae from the same pond. The pond which previously occupied an area of approximately 48' X 48' had dehydrated to an area of approximately 15' X 15' facilitating collecting.

The Jefferson's larvae were in various stages of development with most of the specimens obtained mature, and many transforming. No A. opacum larvae were observed and those of A. maculatum were moderately advanced but small enough to distinguish them from the larger Jefferson's.

The immediately adjacent deciduous woods were investigated thoroughly for adults but none was observed. This, however, is not surprising when one considers the burrowing habits of this species and the temperature of 88 F. prevailing in the area searched at this time. Adults of this species will undoubtedly be taken at this locale in the future, during the breeding time, barring destruction of the pond.

Now that this species has been found off the Allegheny plateau in the physiographic area of the Allegheny ridges, diligent search should reveal its presence in the provinces of the Cumberland Valley, Blue Ridge and the Piedmont Plateau. Since, however, it is primarily a mountainous form it is not to be expected east of the Fall line.

Ed. note: Since the publication of this article in 1952, a few other localities have come to light. Most have been in the previously known range in Allegany and Washington Counties, but recently (1966, Bull. Md. Herp. Soc. 2(2):8-9) specimens were recorded from near Thurmont, Frederick County, Maryland, which is on the eastern edge of the Blue Ridge section of the Appalachian Province. A. jeffersonianum is still unreported from the Great Valley section of the Appalachian Province. Diligent searching may also reveal its presence in the Western Division of the Piedmont Province of Maryland.

The photographs of the species illustrate very well the long toes on the distal extremities which are a specific character often used to differentiate this species from other Ambystoma.



Fig. 1 - Adult A. jeffersonianum 120 mm. Kansas



Fig. 2 - Mature A. jeffersonianum larvae 50 mm.
Washington Co., Maryland, June 17, 1952



Fig. 3 - Recently transformed A. jeffersonianum 54 mm.

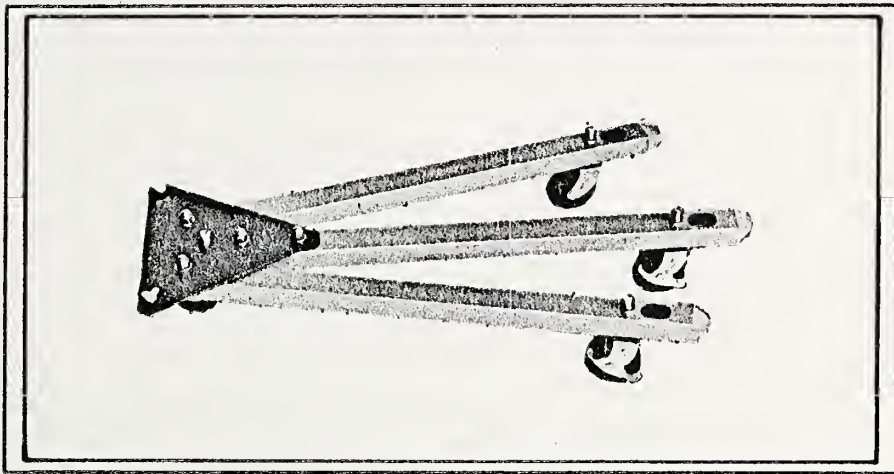


Fig. 4 - Breeding Pond, Washington Co., Looking east. June 17, 1952

Miscellaneous News and Notes

Aids To The Naturalist Photographer

This is the first in a series of articles which will deal with equipment, techniques and books that may be of interest to the person engaged in natural history photography. It is the purpose of this series to acquaint the reader with the latest developments in this field. It is fully realized that people pursuing this interest have set standards and procedures that work very well for them. The author only wishes to call to the reader's attention newer and, perhaps, easier methods of obtaining his goal.



The Lightweight Portable Dolly

A piece of equipment that speeds up the taking of pictures, both still and motion, is a dolly. This is a timesaving device on which a tripod and camera can be placed and the entire rig moved across the floor with surprising ease.

Until recently the only dollies that were available were classed as professional equipment - consequently, they were both heavy and costly. Today there is available from Superior Bulk Film Co., 443-450 N. Wells Street, Chicago, Ill., 60610, a low-cost portable dolly. It is of all metal construction and designed to accept both amateur and professional tripods. Even with its all metal construction it weighs less than five pounds. Its mobility is guaranteed by four rubber wheels. The fourth wheel is located on the plate where the three

support arms join, and gives added sturdiness. Wheel locks are found on two of the wheels and are used to keep the dolly stationary. The arms are locked in place by wing bolts - loosen the wing bolts and the arms fold back to form a neat, compact portable package.

This dolly is being used by the author in both still and motion photography. It is especially useful in set-up or tabletop photography where a great deal of subject manipulation is involved. The camera, tripod and dolly are easily moved aside during the set-up and easily moved back to any picturetaking position. This low-cost portable dolly is now an indispensable piece of equipment and is in constant use.

Daniel J. Lyons, Dept. Photography, Natural History Society of Maryland
2643 N. Charles Street, Baltimore, Maryland 21218.

Treasurer's Report

10 Nov. 1966 to 19 Nov. 1966

Income

\$338.00	Regular Membership Dues
118.00	Subscribing Membership Dues
3.25	Sale of Bulletin and Reprints
100.00	Grant from N.H.S.M.

\$559.25 Total Income Received

Expenditures

\$169.00	N.H.S.M., for use of building, Sec. Serv., Mailing, etc.
110.65	Publication of Bulletin
75.00	Lecture Fees
8.00	Refund on Overpayment
24.15	Program Expenses

\$386.80 Total Expenditures

\$559.25	Total Income Received
386.80	Total Expenditures

\$172.45 Bank Balance 19 Nov. 1966

Daniel J. Lyons, Treasurer, 25 January 1967

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Department of Herpetology, Natural History Society of Maryland

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The Cover: An Eastern Narrow-mouthed Toad, Gastrophryne
carolinensis, from Cove Point, Calvert Co., Md.
Photograph by Dr. Robert S. Simmons

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Ed. note: Manuscripts being submitted for publication should be typewritten (double spaced) on good quality 8½ by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by author. Reprints are available at \$.01 a page (\$.02 a page with photographs) and should be ordered when manuscripts are sent in.

Notes on Albinism in Elaphe g. guttata

Throughout the centuries, man has acquired much knowledge about his environment, including that of the animal and plant kingdoms. Much of this knowledge has been recorded by the professional scientist as well as the amateur. While accumulating this knowledge, man has frequently encountered the so called "freaks" that nature has provided. One of the most interesting, is the albino. Some scientists say that all animal and plant species probably have albino representatives. Nature has provided the herpetologist with many such albino specimens. This article is concerned with the albino specimens of Elaphe g. guttata (Corn Snake). Albinism is a condition where dark pigments are lacking. In 1959 Dr. H. Bernard Bechtel of Johnstown Pa. bred an albino male with 3 normal female corn snakes. These matings produced 46 young of the F₁ generation, 10 of which were kept by Dr. Bechtel and subsequently bred to produce 7 albino and 17 normally colored young in the F₂ generation. (Bechtel and Bechtel, 1962)

Fig. 1. Simple diagrams can help theoretically explain Dr. Bechtel's results:

<u>The Original Breeding</u>		a	a	
	N	Na	Na	NN - Normal aa - Albino Na - A normal colored specimen, but carrying albinism as a recessive gene.
	N	Na	Na	

All young produced are heterozygous, that is they carry the recessive gene for albinism. (F₁ generation)

<u>Breeding the F₁ Generation Parents</u>		N	a	
	a	Na	aa	Theoretically, $\frac{1}{4}$ will be normal, $\frac{1}{4}$ will be albino, and approx. $\frac{1}{2}$ will be carrying albinism as a recessive gene. Young produced here are of the F ₂ generation.
	N	NN	Na	

The above diagrams show that by breeding an albino with a normal, the young (F₁ generation) will be normal in coloration due to albinism being recessive. But the albinism will show up in the F₂ generation, that is when the normal colored specimens carrying the recessive gene (of the F₁ generation) are bred.

In January 1961 three pair of the heterozygous corn snakes of the F₁ generation were donated to the zoo by Dr. Bechtel. These snakes were raised separately until the spring of 1962. At this time they were all placed together into a larger cage for a period of about 30 days. During this time courtship activity was noted, but no actual mating was observed. No eggs were laid in that year. The three pair were again placed together in a large cage from 6 March 1963 to 20 April of the same year. This time courtship activity was

noted, and one actual mating was observed.

On 13 May 1963, 1 female deposited 25 eggs and on 18 May 1963 another female laid 22 eggs. Of the 47 eggs, about one-third appeared to be infertile. During incubation several more eggs spoiled. The remaining eggs hatched between 2-6 August 1963. These matings produced 6 albino and 27 normal corn snakes. These young of the F₂ generation were raised in separate cages and were fed newly-born mice. In a period of 4 months the young corn snakes doubled in size.

During the first weeks of May 1966 it was decided to try and breed the albino corn snake. Two females and one male were placed together in a large cage for a period of one week. Courtship activity was noted immediately, but no actual mating was observed. On 18 May 1966 one of the female albino corn snakes deposited 10 eggs. The female was 36 inches in length, and the average weight of each egg was 7.7 grams.

On 23 July 1966 the first egg started to hatch. By 1 August 1966 all but one of the remaining eggs had hatched. A total of 9 eggs hatched; one egg had decomposed. All the hatchlings are albinos.

On 22 May 1966 the other female albino corn snakes laid 10 eggs, 9 of which were fertile. On 24 July 1966 the first of these eggs started to hatch. On this date two snakes slit their egg shells. On 25 July 1 hatchling emerged from its egg. By 30 July 1966 3 eggs had hatched, while those remaining showed signs of spoilage. All hatchlings from this batch of eggs are albino snakes. A total of 12 albino corn snakes from the F₂ generation were born at the zoo in 1966. At the time of this writing, the breeding experiments carried out at the Baltimore Zoo between the heterozygous (F₁) and the albino (F₂) corn snakes have produced a total of 22 albinistic specimens. The results of these experiments help support the theory that albinism is inherited through the action of a singly recessive gene (Groves, 1965).

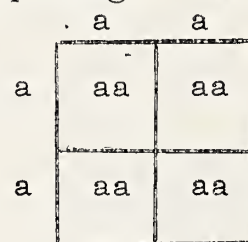


Fig. 2. Another simple diagram explains why the young from a breeding between albino parents produce only albino young.

The albino corn snake has a ground color of pinkish orange, with lighter sides. The dorsal surface has blotches of red or orange, with white edges. The ventrals are white with a light tannish-orange checkered pattern. The eyes and tongue of the albino specimens are red.

An interesting fact about the shed of a albino corn snake is there is not a trace of pattern, due to complete lack of dark pigment. Normal corn snakes shed have a distinct pattern. These snakes are being raised in separate cages and are being fed on newly-born mice.

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- John D. Groves Reptile House Baltimore Zoo Baltimore, Maryland.

The Snakes of Long Island

Check List of the Snakes of Long Island:

1. Eastern Worm Snake, Carphophis amoenus amoenus
2. Northern Black Racer, Coluber constrictor constrictor
3. Timber Rattlesnake, Crotalus horridus horridus (Extinct ?)
4. Northern Ringneck Snake, Diadophis punctatus edwardsi
5. Eastern Hognose Snake, Heterodon platyrhinos
6. Eastern Milk Snake, Lampropeltis doliaata triangulum
7. Eastern Kingsnake, Lampropeltis getulus getulus (Doubtful ?)
8. Northern Water Snake, Natrix sipedon sipedon
9. Rough Green Snake, Opheodrys aestivus (Questionable ?)
10. Eastern Smooth Green Snake, Opheodrys vernalis vernalis
11. Northern Brown Snake, Storeria dekayi dekayi
12. Northern Red-bellied Snake, Storeria occipitomaculata occipitomaculata
13. Eastern Ribbon Snake, Thamnophis sauritus sauritus
14. Eastern Garter Snake, Thamnophis sirtalis sirtalis

Account of Species:

Carphophis amoenus amoenus - The small and secretive Eastern Worm Snake formerly occurred in Kings and Queens Counties. Amoenus was found at Bay Shore in 1913 (Engelhardt, Nichols, Latham, & Murphy, 1915).

Coluber constrictor constrictor - An unusually large, seventy-inch, specimen of the Northern Black Racer was found at East Marion (Engelhardt, Nichols, Latham, & Murphy, 1915). A late appearance date record for constrictor was October 8th (Engelhardt, Nichols, Latham, & Murphy, 1915).

Crotalus horridus horridus - According to Reilly, the last record of a Timber Rattlesnake from Long Island was in 1915. Horridus is probably extinct here at the present time.

Diadophis punctatus edwardsi - A colony of Northern Ringneck Snakes was reported occurring in a woodland area bordering a cranberry bog at the Weeks Estate in Yaphank (Engelhardt, Nichols, Latham, & Murphy, 1915).

Heterodon platyrhinos - The black phase of platyrhinos was at one time reported not uncommon in the wooded regions around Jamaica (Engelhardt, Nichols, Latham, & Murphy, 1915). It is, undoubtedly, extinct in those regions today. A specimen of the Eastern Hognose Snake collected by the author at Southold, went through the usual puffing and hissing antics associated with the species, but it failed to "play dead."

Lampropeltis doliata triangulum - Engelhardt, Nichols, Latham, & Murphy (1915) reported that the Eastern Milk Snake was generally distributed, but not common.

Lampropeltis getulus getulus - Dekay (1842) reported that getulus was rarely found on the brushy plains. This record was considered doubtful by Engelhardt, Nichols, Latham, & Murphy (1915), as no other records were known.

Natrix sipedon sipedon - A large female sipedon collected by the author, at Calverton, gave birth to about twenty-seven young. Mittermeier (1966) reported finding a Bullfrog (Rana catesbeiana) in the jaws of a huge Northern Water Snake at Calverton.

Opheodrys aestivus - Pope (1946) stated that the Rough Green Snake is excessively rare on Long Island without mentioning any specific records.

Opheodrys vernalis vernalis - Engelhardt, Nichols, Latham, and Murphy (1915) reported the finding of vernalis at Mount Sinai and Easthampton. On 19 June 1966, I collected an Eastern Smooth Green Snake in a field at Brookhaven Township near Jerusalem Hollow Road.

Storeria dekayi dekayi - Engelhardt, Nichols, Latham, and Murphy (1915) stated that dekayi was common within the New York City limits, while not in the Orient Point district.

Storeria occipitomaculata occipitomaculata - The finding of an occipitomaculata at Mount Sinai on 11 September 1914, was reported by Engelhardt, Nichols, Latham, and Murphy (1915).

Thamnophis sauritus sauritus - Sauritus was reported to be more common than sirtalis at Mastic (Engelhardt, Nichols, Latham, & Murphy, 1915).

Thamnophis sirtalis sirtalis - According to Engelhardt, Nichols, Latham, and Murphy (1915), the Eastern Garter Snake is the most abundant snake on Long Island. On 12 March 1967, I collected a sirtalis (approx. 22") at Rockville Centre. The air temperature at the time of its capture was about 47 degrees F°.

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- Frederick C. Schlauch, Post Office Box 103, Oceanside, Long Island, New York, 11572.

Notes on the Northern Fence Lizard, Sceloporus undulatus hyacinthinus, from Allegany County, Maryland.

Although the Fence Lizard, Sceloporus undulatus hyacinthinus, occurs in great abundance on the coastal plain of Maryland, this lizard appears to be relatively rare west of the Fall Line. Apparently this species becomes less common as one goes west with no records from the Allegheny Plateau of western Allegany and Garrett counties (Cooper, 1965). McCauley (1945) found this species as far west as Fort Hill High School, Cumberland, Allegany County, approximately four miles east of the plateau. Other records from this county include Flintstone and Fifteen Mile Creek. Since this species appears to be so uncommon in this area, it maybe helpful to list another locality. On 30 April 1967 my wife and I obtained two adult specimens (male and female) from Rocky Gap which is located on the southern flank of Evitts Mountain at an elevation of 1180 feet. This is approximately 5.5 miles northeast of McCauley's Fort Hill High School record.

The male lizard measured 72 mm. (body length) and 156 mm. (total length); the female was 66 mm. and 154 mm. Both specimens had normal scalation with 5 supraoculars, 5 supralabials and 6 infralabials. The dorsal surface of the male was uniformly tan while the female had six irregular chevron markings on a tan background. The male had the usual bright blue bands on the venter.

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- L. Richard Franz, Parkville High School, Baltimore, Maryland

NOTES ON THE HERPETOLOGY OF PANAMA: PART 3

Ameiva ameiva

Some individuals were observed at Kobbe Beach, Fort Kobbe and Howard Air Force Base, Canal Zone during 1966. They were often seen running along dirt roads, among rocks near the beach, on the golf course at Fort Kobbe, or along drainage ditches in open, cultivated, and grassy areas. Young individuals are striped and whip-like in appearance while adults are often vividly spotted. The species is never striped down the center of the back.

Man's influence on this species in parts of Panama was presented by Heatwole (1966) in a previous study and summarized here: "... in pre-Columbian times, a relatively continuous, open, cultivated area extended throughout much of the interior of eastern Panama, but has now been replaced by almost unbroken forest (the "Darién Gap"). Of particular interest in relation to the previous history of Darién is the lizard Ameiva ameiva. I have searched for it in cleared areas which seemed to be suitable habitat (pastures, airfields, etc.) around some of the oldest extant Panamanian settlements in Darién (El Real and Yaviza) without success. Hence, I believe A. ameiva is now absent in the Darién Gap. It seems likely that this species was once continuously distributed over the Isthmian interior, its range becoming disjunct as a result of post-Columbian reforestation, an event of such recent occurrence that there has been insufficient time for differentiation of the separated populations."

Anolis auratus

This is another "open area" lizard, and the majority of my specimens were seen along small drainage ditches on the golf course at Fort Kobbe, Canal Zone, or in the weeds near ponds at Cocoli, Canal Zone. The species is brown in color, having a white belly, and a yellow stripe on each side of the head at eye level.

Anolis limifrons

A forest anole, this species is characterized by a sharply banded tail and smooth ventrals on the belly. The neck pouch is white with yellow in center. Heatwole mentioned it as the most abundant inhabitant of the tree trunks and saplings in his Darién study of the Silugandi region.

Anolis tropidogaster

This name is currently applied to two anoles, also known by the name of Anolis stigmus. The one referred to here is a stocky-built lizard compared to the one following.

Anolis tropidogaster sp.

This is a slender anole, characterized by keeled belly ventrals and a reddish-orange neck pouch. It is probably the most common of the Anolis in the western Canal Zone area. Most of my specimens were taken on trees, branches, logs or leaves in the forest. Two specimens collected on 9 July 1966, each had body lengths of 48mm (1.89 inches), and total lengths of 147mm (5.79 inches) and 149mm (5.87 inches) respectively. On October 28 at night, I found a young specimen sleeping on a leaf in the forest near Cocoli, Canal Zone.

Basiliscus basiliscus

My first individuals were observed on 21 May 1966 near Gamboa, Canal Zone. These were two specimens seen at the edge of a river. One ran up a tree and the other escaped into the weeds. On September 4 a specimen was seen in a tree at the edge of an inlet of the Panama Canal. When approached, the lizard crawled out onto a branch and dived into the water. On September 10 a number of small specimens were seen along a stream at Cocoli, Canal Zone. One individual was captured at that time, others were seen there again on September 25, running down the stream on top of the water as approached. While frog-hunting on the night of November 2, I saw a specimen in a small tree in the shallow



Fig. 1. Basiliscus basiliscus from Cocoli, Canal Zone.

water of a pond, but the lizard dived into the water and was not seen emerging. I returned to the same spot the night of November 12, and what may have been the same individual was again in a small tree at the pond. This time the specimen was quickly grabbed. My final specimen of the year was caught on December 17, under a log in the forest near Cocoli.

Bufo typhonius

This is a small toad, and one of the most varying species in Panama. Presence of all head ridges and small parotoids are among the characteristic features, as well as the occipital ridges not being prominent nor the warts spiny. I collected two specimens on December 17 in the forest near Cocoli, Canal Zone. Both were found during the day along small, shallow streams and upon approach one individual dove into the stream and came to rest on the bottom. One specimen was brick-reddish in color, with azure specks; the other was brown and yellowish with a light stripe down the back (the first individual was un-striped, Fig. 2.).



Fig. 2. Bufo typhonius, un-striped form, from Cocoli, Canal Zone.

Ctenosaura similis

The Black Iguana is largely a beach-front lizard, and is often seen sunning itself among the boulders. They are very hard to approach, however, usually retreating to cover beneath the rocks or down into crevices. Most of my specimens were seen at Kobbe Beach, Fort Kobbe, and Venado Beach, Canal Zone. At Venado Beach one day I was able to noose three of these lizards by attaching string to a long pole. This was along the Rio Venado close to the beach area.

Gymnophthalmus speciosus

This species could easily be mistaken for a skink because of its appearance, but it is actually a Teiidae. In general, it looks like the Ground Skink of the southeastern United States, being small and olive-colored, but it has a red tail. I saw several of these lizards during 1966, all of them along drainage ditches on the Fort Kobbe golf course.

Lepidoblepharis sanctaemartae fugax

I recorded one specimen of this tiny ground gecko on a dirt road through the forest. This was on 29 May 1966 at Fort Kobbe, Canal Zone (about mid-day). This species is identified by its small size and yellowish blotch on the back of the head. The general color is brownish.

Lepidodactylus lugubris

This species of gecko is native to southeastern Asia but has been introduced into the Canal Zone. I took four specimens during 1966, all at Howard Air Force Base, in the western Canal Zone. The first was an adult, found running across the third floor of a barracks on June 24. Young geckos were found in the same barracks on two occasions, one on a uniform (July 15) and one on a bed. The final one was an adult, taken outside on the wall of a building in the evening.

Mabuya mabouia

A couple of specimens of this fair-sized skink were seen in the weeds along the edge of a pond near Cocoli, Canal Zone on 4 September 1966. On October 15 I saw an individual in an old cement room at Fort Kobbe, C. Z. In the same room on December 13 another inhabitant was seen and captured. Sexton (1964) noted Mabuya mabouia as associated with a Chocó Indian hut at the Río Canción, Panama. He stated that they were common around the Chocó hut and other similar ones, but rarely observed elsewhere in the area.

Kinosternon angustipons

Probably the rarest turtle in Panama. Information on this recently described species is known from an individual taken in the Almirante region (2 mi. E and 1 3/4 mi. S Guabito, Bacas del Toro) in a scummy, nonturbulent back-water of a small stream having rapid current and muddy bottom (Legler, 1966). It was also added: "Intensive trapping in habitats seemingly suitable for angustipons but outside its known range have produced series of other kinosternids (chiefly K. leucostomum) but no angustipons at the following places in Panama: 1) the Atlantic coast near Colon and some 30 kilometers westward; 2) numerous localities on the lower Río Chagres drainage; 3) the San Blas coast, abreast of, Ailigandi and Mulatupu islands; and, the Chucunaque drainage of Darién, near El Real."

On the reproduction of this uncommon turtle Legler writes: "A female from Panama contained a shelled oviducal egg when captured in July 1960 and laid the egg in the water of an aquarium 11 months later; the egg spoiled some weeks later and was presumably infertile. When this female died 3½ years later, her ovaries bore four follicles ranging from 16 to 19 mm. in diameter, three from 3 to 5 mm., and a number of smaller follicles. The larger follicles were judged to be of ovulatory size; they were discolored (brownish to purplish) and probably atretic. The smaller follicles were pale yellow and appeared

to be in good condition. One oviduct was slightly distended, flaccid, and thin-walled (as when eggs are borne in the tube or have just been expelled), and the tube was filled with cloudy viscous fluid. It is uncertain whether this condition of the oviduct can be attributed to damage from former retention of an egg for nearly a year, or to the preparation of the tube for ovulation."

Legler continued: "The one known egg of K. angustipons is elliptical, white, and 40 x 22 mm. The outer surface is semiglazed and irregularly lumpy, but not granular. The central three fifths of the shell (not the ends) is distinctly porous, each pore consisting of a symmetrical crater having an irregularly angular internal opening (largest pore 0.4 mm. in diameter and half as deep). Comparison with oviducal eggs of K. leucostomum (Panama) and laid eggs of K. scorpioides (Panama) reveals that the former lack the symmetrical craters but have numerous jagged external pores and the latter have few or no pores. These differences in surface porosity may or may not be indicative of specific differences; thickness of shell and surface texture are certainly influenced by the length of time an egg remains in the oviduct."

Kinosternon leucostomum

Synonymous with Kinosternon postinguinale in Panama. Schmidt (1947) presents the following key:

Lobes of plastron expanded, width of anterior lobe more than 0.6 of greatest width of shell.

..Keels on carapace obscure or not at all evident.

..Carapace rounded, no carapacial keels or at most an indication of the median keel; gular shield less than half the length of the anterior lobe of the plastron.

..Posterior lobe of plastron rounded, widest at or near the hinge.

Males have well-marked opposing patches of spines on the inner surfaces of the tibial and femoral joints of the leg.

I collected 3 specimens during 1966, all in a single stream flowing into the Rio Cocoli (Canal Zone). The first two were found in pools along the stream during the day on July 2. One measured 127mm (5 inches), and the other, 150mm (5.91 inches). The third specimen was taken at 6 p. m. on July 9, while it was tearing away vigorously at moss along the bottom of a shallow portion of the stream. Length was 139mm (5.48 inches).

Kinosternon scorpioides

Also known in Panama as Kinosternon panamensis, this Mud Turtle is easily identified by three keels along the length of the carapace. Dunn (1933) reported two specimens under the name K. cruentatum were brought to him from a swamp at El Valle De Anton, Panama.

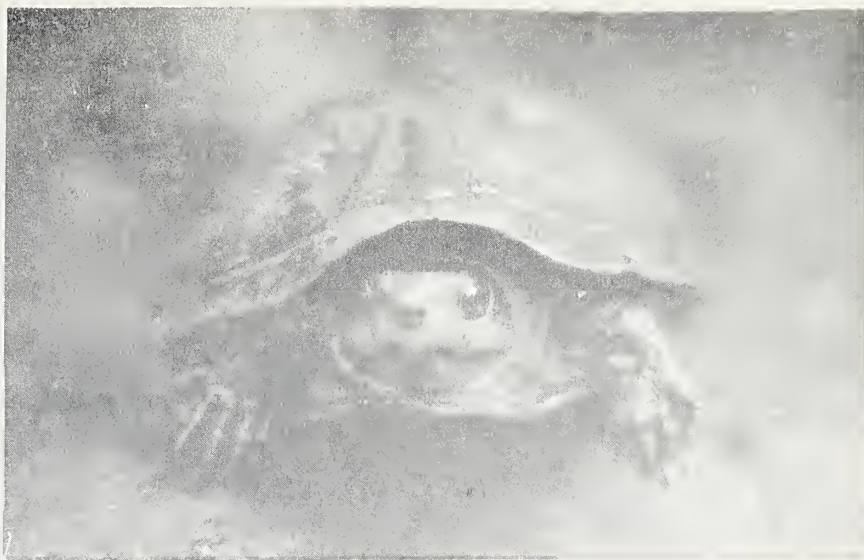


Fig. 3. Kinosternon scorpioides from Fort Kobbe, Canal Zone.

List following is of specimens recorded during 1966.

<u>DATE</u>	<u>LOCALITY</u>	<u>TIME</u>	<u>LENGTH</u>
May 30	Fort Kobbe, Canal Zone	7:40 a.m.	145mm (5.70 in.)
July 2	Fort Kobbe, Canal Zone	Evening	Juvenile
July 9	Fort Kobbe, Canal Zone	9:30 a.m.	40mm (1.56 in.)
July 16	Fort Kobbe, Canal Zone	9:00 a.m.	42mm (1.65 in.)
July 16	Fort Kobbe, Canal Zone	9:30 a.m.	44mm (1.73 in.)

The May 30 individual was found in a pool along a jungle stream bed. The July 2 juvenile was DOR, found on a dirt road above the same stream. The specimen found on July 9 was at the edge of a small pool near a shallow stream, and emitted an unpleasant odor when picked up. Both Mud Turtles found on July 16 were in the same area as the turtle found on July 9. One was on some branches on the ground and the other was among rocks along the stream bottom. The latter almost went undetected. Both specimens emitted a musky odor when picked up.



Fig. 4. Plastron of Kinosternon scorpioides from Fort Kobbe, Canal Zone.

Notes on Additional Species

Quite the opposite of Panama's Kinosternon are the large Sea Turtles found off her coasts. A friend of mine encountered an individual at Santa Clara Beach along the Caribbean coastline--the side of the isthmus where they are reported to appear more frequently.

Parsons (1962) mentions the occurrence of the Green Sea Turtle, Chelonia mydas, in Panamanian waters as far back as 1685: "The green turtle does not appear to be particularly common on the Pacific coast of Central America. But 200 years ago there was clearly a major concentration of them on the uninhabited island of Coiba (Quibo), fifteen miles off the southwest coast of Panama. Dampier, who was there for five weeks in June and early July 1685, wrote while there that his party 'struck turtle every day, for they are now very plentiful'. This suggests harpooning in open water. But from the experience of George Anson, who rested his squadron at Coiba in December 1741, after his sack of Paíta, it is clear that the island beaches were alive at night with egg-laying females. His chronicler, Richard Walter, refers to 'the prodigious quantity of turtle...(of which) we took what quantity we pleased with great facility,' turning the females at night as they hauled up onto the beach. Enough were taken to provision them for a month at sea.

The Englishman Colnett, at Coiba in February 1794, complained of the difficulty of taking turtle there, although they were seen 'in great abundance,' apparently offshore. Occasional greens are said to be turned on the beaches of the Gulf of Panama and the Pearl Islands, or netted in adjacent Pacific waters, but most reaching the Panama City market today come from the Caribbean side of the isthmus. It seems probable that the Coiba turtles have suffered the same fate as so many other turtle populations, pressed to the wall by the inadvertent interference of man."

The Crocodylia includes the Caiman (Caiman fuscus) and the American Crocodile (Crocodylus acutus). Both are occasionally seen in the Panama Canal and both are recorded from Barro Colorado Island in the central Canal Zone. Small Caimans are active at night along many backwater streams. Schmidt (1924) presents the following key to Crocodylus acutus:

- A. Premaxillo-maxillary suture produced backward; snout moderate or slender.
- B. Mandibular symphysis extending to the fourth or fifth tooth; nasal bones entering the external narial aperture. (Mazatlan, Mexico, to Ecuador; Central America, Cuba, Jamaica, Haiti, and the southern tip of Florida).

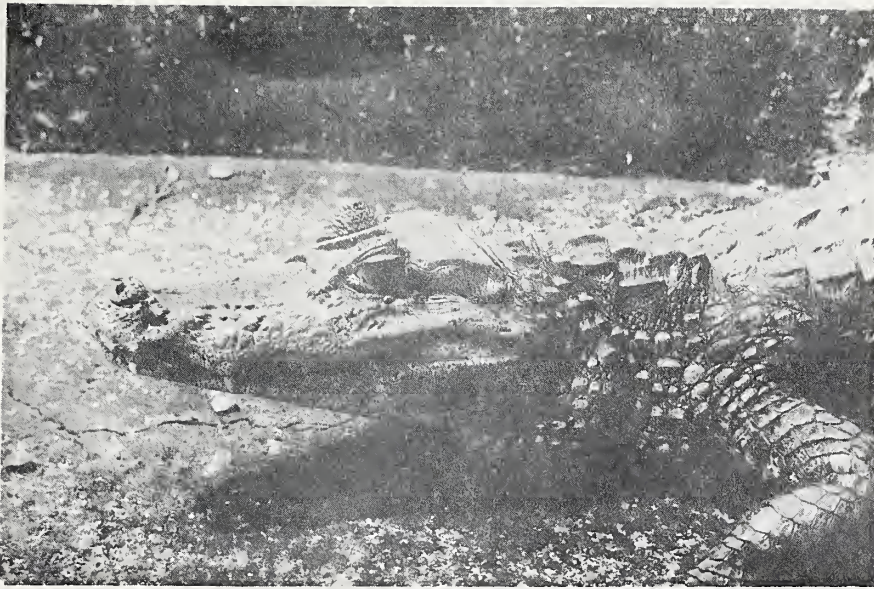


Fig. 5 Caiman fuscus

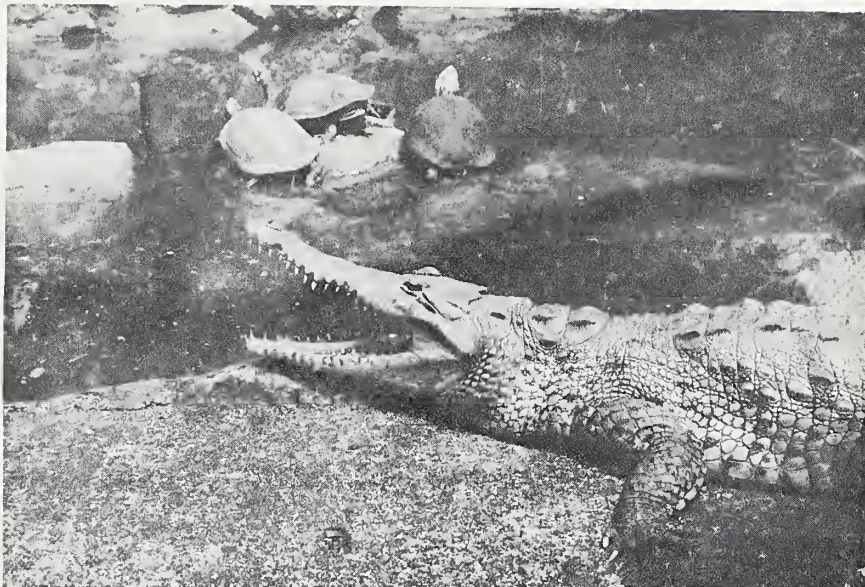


Fig. 6 Crocodylus acutus

Salamanders are extremely rare in central Panama's Canal Zone, where Caudata includes only a single genus- Oedipus (belonging to the Family Plethodontidae). A continuation of Dunn's key (1931) follows with the salamander genus Oedipus and frog genera Phyllobates (or Prostherapis) and Atelopus. The latter genus is not recorder from the Canal Zone but is found adjacent to it.

Key to Canal Zone Oedipus

- A. Legs well developed; not wormlike; 14 costal grooves..lignicola
- AA. Legs minute; wormlike; 17 costal grooves.
 - B. Snout rounded; eyes well developed; usually a light dorsal band.....complex
 - BB. Snout pointed; eyes minute; uniform.....parvipes

Key to Canal Zone Phyllobates

- A. Markings white; no linear markings below.
 - B. Tadpole with normal mouthparts; male with normal third finger; no complete light streak from groin to above eye.
 - C. A light streak from groin to below eye; a dorso-lateral light streak from sacrum to above eye, above a lateral black band; male with black throat; disk of toe 1 equals $\frac{1}{2}$ disk of toe 2; disk of toe 5 equals disk of toe 4; toe 5 reaching penultimate joint of toe 4.....talamancae
 - CC. No marked light streak from sacrum; at least a trace of a light streak from groin in lateral black band.
 - D. Large (30mm.); mottled below with gray in both sexes; a trace of groin streak; disk of toe 1 about equals disk of toe 2.....kingsburyi
 - DD. Smaller (21mm.); white below in both sexes; groin streak prominent to middle of side; disk of toe 1 equals $\frac{1}{2}$ disk of toe 2; disk of toe 5 about equals disk of toe 4.....latinasus
 - BB. Tadpole with umbrella mouthparts (much produced lower lip and reduced labial teeth); male with much swollen third finger; a light streak from groin to above eye, cutting diagonally across lateral black band; disk of toe 1 equals $\frac{1}{2}$ disk of toe 2; disk of toe 5 equals $\frac{1}{2}$ disk of toe 4.....flotator

Key to Canal Zone Region Atelopus

- A. Almost entirely light yellow, sometimes a dark X-mark on head.....varius cruciger
- AA. Nearly uniform dark brown; tiny yellow markings (dots or semicircles).....varius glyphus

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ACKNOWLEDGMENTS

The author is indebted to Charles W. Myers, Gorgas Memorial Laboratory Panama, R. de P., for assistance in the identification of specimens and the use of unpublished notes.

K. Nemuras, 605 ACS, Box 3012-161, Howard AFB, Canal Zone

THE CARPENTER FROG IN MARYLAND

by
Roger Conant, Philadelphia Zoological Garden

Ever since its discovery in Delaware in 1936 (Conant, 1940), it has been virtually a foregone conclusion that the carpenter frog (Rana virgatipes) eventually would turn up on the Eastern Shore of Maryland. But eleven years of intermittent collecting have been required to find it. Two things have conspired to make this coastal plain endemic more or less of a rarity - the apparent requisite of a sphagnaceous environment and the circumstance that few such habitats remain in a region that has been extensively drained and otherwise altered for agricultural purposes. As a matter of fact, the frog still would be missing from the state list if a few amorous males had not given voice to their characteristic "hammering" call at just the right time.

During the late morning of April 10, 1947, my wife and I visited a small swamp, near the edge of the Blackwater Wildlife Refuge, where on several occasions I had previously collected a number of interesting reptiles and amphibians without encountering any evidence that Rana virgatipes might also be an inhabitant of the same body of water. The locality, near Gum Swamp, is approximately five miles south of Church Creek in Dorchester County. The bog, which is not very extensive is bisected by an abandoned (formerly corduroy) lumber road. Loblolly pines, Pinus Taeda, are the dominant trees of the vicinity, but numerous sweet gums and red maples also grow in or at the water's edge. There are dense clumps of shrubs here and there, and the bog is thickly overgrown with sphagnum and other aquatic vegetation. The bottom is firm and, in so far as could be determined, the water nowhere exceeds about two feet in depth.

Shortly before noon we were startled to hear the unmistakable call of virgatipes. Three or four males joined in the chorus, but after not more than a minute they lapsed into silence. They called only one other time during the two hours we were in the vicinity. I made a circuit of the swamp, wading continuously for nearly an hour, and, although I was able to stalk close enough to make positive identification upon five individual carpenter frogs, I succeeded in catching only two. These were both males, with head-body measurements of 62 and 49.5 mm., respectively. They are numbers 568 and 569 in the temporary study collection being maintained at the Philadelphia Zoological Garden.

The only other species of frog that was occupying the identical habitat was Rana pipiens, but Acris crepitans was very numerous in marshy spots along the abandoned road. Other amphibians and reptiles collected near-by on the same or other days include Ambystoma opacum, Bufo w. fowleri, Lygosoma laterale, Eumeces fasciatus, Coluber c. constrictor, Lampropeltis g. getulus, Natrix s. sipedon, Thamnophis s. sauritus, and Clemmys guttata.

* Reprinted from Maryland XVII (4): 72 - 73, with the permission of the Natural History Society of Maryland.

The carpenter frog probably will be found in other localities on the Del-Mar-Va Peninsula and possibly on the coastal plain of mainland Maryland as well. The most sensible way to search for it would be to visit sphagnum bogs and swamps during the calling season. It has been heard in Delaware on dates ranging from May 2 to June 20. (The only known locality for the state is in the remnants of the great Cedar Swamp south of Millsboro and just north of the Maryland line.) In the New Jersey pine barrens, where the species is abundant, choruses have been recorded as early as April 14 and as late as June 21, but I have also heard individual frogs or small groups singing up to and including August 4.

Reference Cited

Conant, Roger

1940. Rana virgatipes in Delaware.

Herpetologica, Vol. 1, pp. 176-177.

Ed. note: Since the publication of this note in 1947 a few other localities have come to light. Reed (1958, Herpetologica, 13 (4): 276) reports specimens collected by Ralph Daffin and himself from swampy woods at two localities in Worcester Co., Md: Md. Rt. 12, S. Millville, Pocomoko State Forest, May 18, 1957; Nossowango Creek, August 31, 1957. In a prior paper, Reed (1957, Herpetologica, 13 (2): 137-138) mentions Conants Dorchester County record and also a record from Marylands western shore: Nr. Mason Springs, Charles Co., Md. Since the Charles County specimen is apparently unavailable this record cannot be accepted. More diligent searching in Maryland may help clearly define the range of Rana virgatipes.

THE UPLAND CHORUS FROG IN MARYLAND

by
James A. Fowler

The upland chorus frog, Pseudacris brachyphona (Cope), is one of the least known of our Maryland frogs and toads. At the present time this frog is known only from Garrett County in the extreme western part of the state. Its range, however, embraces the Appalachian Plateaus physiographic province from southwestern Pennsylvania to eastern Ohio, Kentucky, West Virginia, the western part of Virginia, eastern Tennessee, and as far south as northern Alabama (Walker, 1946). In Maryland, this species is likewise limited to the Appalachian Plateaus inasmuch as Garrett County lies entirely within this province.

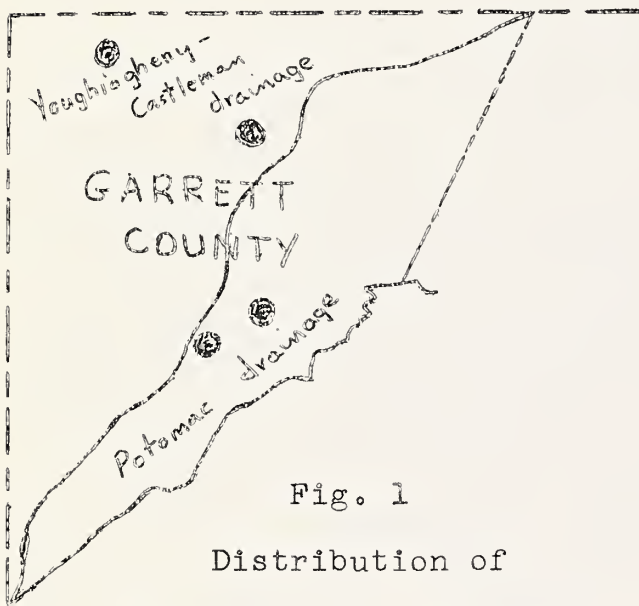


Fig. 1

Distribution of
Pseudacris brachyphona
in Maryland

Pseudacris brachyphona like other tree frogs (Hylidae), has the tips of its digits expanded to form adhesive disks. These disks are, however, quite small compared with those of the species of Hyla. Compared with cricket frogs (Acris), P. brachyphona has distinct tympanums and only slightly webbed hind toes. It is a medium-sized Pseudacris and is from 1 to 1 3/8 inches long. The undersides are yellowish in life and are covered with fine granulations. The dorsal color varies through several shades of brown. The dorsal markings consist of a black triangle between the eyes and a pair of broad, crescentric bands from the eye to the groin. In some specimens these bands curve inwards and meet to form a cross (somewhat as in Hyla crucifer) or they may be joined together by a bar to form the letter "H".

A few specimens have no definite pattern. The limbs are also barred or spotted with dark.

Specimens of Pseudacris brachyphona from Garrett County, Maryland were mentioned by Walker (1932) on the basis of six individuals in the collection of the Academy of Natural Sciences of Philadelphia collected from Jennings. At that time these specimens constituted the easternmost records for the species. Since 1932, however, this frog has been recorded from three additional localities in Garrett County. These are as follows: Swanton, Backbone Mt., CCC Camp, June 4, 1937 (CM* 12946); Altamont, April 5, 1938 (CM 13678); Selbysport, April 16, 1946 (JAF 38). The Altamont and Swanton records are from the Potomac River drainage, while the Jennings and Selbysport records are from the Youghiogheny-Castleman drainage (Fig. 1). The three specimens from Selbysport were

* Reprinted from Maryland XVII (4):73, 76-77, with the permission of the Natural History Society of Maryland.

males and were calling from a small grassy ditch filled with water along a dirt road at the base of a hillside bordering the floodplain of the Youghiogheny River. Although no eggs were seen, these frogs were no doubt part of a breeding aggregation. Thus, according to Wright and Wright (1933), this species is known to breed from March to May and possibly into June. Moreover, Green (1938) in his studies of the breeding habits of this species in West Virginia has recorded eggs from April 5 to July 2.

Further collecting in western Maryland should greatly add to our knowledge of the distribution of this species in the state. In this connection it is anticipated that it will eventually be recorded as far east at least as that part of Allegany County which, like all of Garrett County, is in the Appalachian Plateaus.

*Carnegie Museum; specimens made available through the courtesy of M. Graham Netting, Curator of Herpetology.

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1938. The breeding habits of Pseudaris brachyphona (Cope) with a description of the eggs and tadpole. Copeia, No. 2, pp. 79-82.

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1932. Pseudacris brachyphona (Cope), a valid species.
The Ohio Journal of Science, Vol. XXXI, No. 4, pp. 379-384.
1946. The Amphibians of Ohio. Part 1. The Frogs and Toads.
Ohio State Museum, Science Bulletin, Vol. 1, No. 3, p. 50.

Wright, Anna Allen and Albert Hazen Wright

1933. Handbook of Frogs and Toads.
Comstock Publishing Company, Ithaca, N. Y., pp. 84-85.

Ed. note: Since the publication of this note, Mr. L. R. Franz has collected specimens of Pseudacris brachyphona on the Eastern edge of the Alleghany Plateau at La Vale shopping center in Allegany Co., Md. See Bull. Maryland Herp. Soc., 1(1):3-14.

FOR MOVIES - WHAT FILM - WHAT CAMERA

Sooner or later the naturalist photographer, who has been directing his talents to still-photography, will decide to make a movie. This decision will raise questions - questions that must be given careful consideration. If not, the results can be both costly and disheartening. Verbal information on this subject should be obtained from people who are actively engaged in this field and not from well-meaning but misinformed still-photographers. Most cities have one or more large retail photographic suppliers that cater to both amateur and professional photographers who engage in both still and motion picture work. These places will definitely be able to supply leads to people who are pursuing this interest. Other excellent sources of information are the numerous books, magazines and pamphlets on the subject of movie making. Much of this material is available from the manufacturers of motion picture equipment. The Eastman Kodak Company, Rochester, New York 14650, and Paillard, Inc., 1900 Lower Road, Linden, New Jersey (Headquarters for Bolex), can provide excellent information on this subject, free of charge or at a nominal cost.

Now to the business at hand. Since the choice of film will determine the choice of camera, film will be discussed first. There are two film sizes available at the present time - 8mm and 16mm (Fig. 1.). Some guiding questions and possible answers are found on the following pages. However, the final choice belongs to the movie maker. It must be further mentioned that photography is in a constant state of change and improvement.

	<u>8mm</u> (Regular &) (Super 8)	<u>16mm</u>
What is the purpose of the film?	Home movies - light documentaries of events.	Scientific work, travelogs.
Who will see the finished film?	Small groups, friends, research teams.	Large groups, people who are lecture goers.
What is the cost?	Nominal, within reach of just about everyone.	About three times the cost of 8mm.
What about B & W film?	Not popular anymore, hard to come by in many places.	Very much in use - many brands to choose from.
What about color film?	Several brands to choose from.	Several brands to choose from and more variety in type.

8mm (Regular &)
(Super 8)

16mm

What emulsions
are available?

Improving all the time
to meet average and
some specialized needs
but may never equal
16mm.

More than enough to
meet any need.

What about lab-
oratory services?

At the present time,
very poor. Many labs
do not have the
equipment to make
prints, etc., from
8mm film.

Available all over
the world. Labs can
meet almost any pro-
ducer requirement
where 16mm is con-
cerned.

What type of
equipment is
available?

Mostly amateur
(except Bolex).

Almost all pro-
fessional.

What about
weight?

Light - easy
handling.

Medium - but handles
well.

What about
accessories?

Just about equal with
16mm or may be adapted
by customizing.

More than enough
to meet any
specialized need.

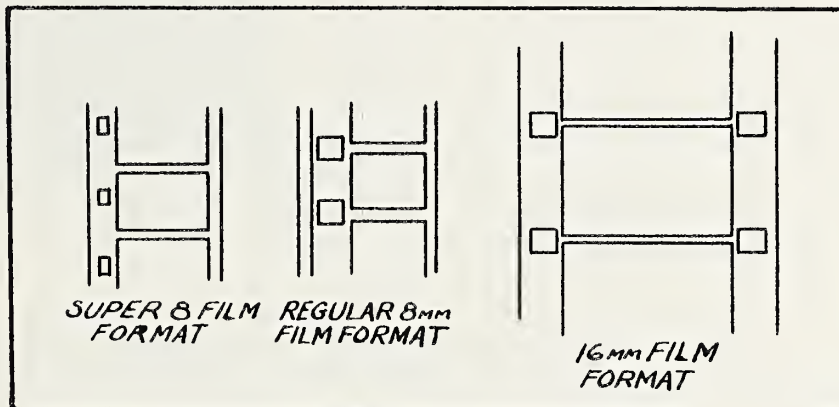


Fig.1.

Is enlargement to
Hollywood-type
productions
possible?

Very poor.

Excellent.

Can sound be
added.

Possibly, but quality not
good at present time.

Excellent.

What about
editing?

Difficult to see, viewer
necessary for inspection-
only amateur equipment
available.

Easy to see, viewer
not necessary for
inspection- pro-
fessional equipment
available.

The reader will undoubtedly be able to add to this list because needs and requirements vary from one individual to another. Whatever film size is chosen, there are cameras available that will do an excellent job.

Since the introduction of the new Super 8, which is definitely superior to the old 8mm film, Paillard has come forth with a Bolex that uses this new film. The new H8 closely resembles the H16, which has been familiar to cinematographers for years. It is of the same high quality workmanship and delivers excellent footage. Its built-in features and the many accessories available for it definitely puts it in the professional class.

The latest model H16 the REX5 (Fig. 2.), has features and accessories too numerous to mention here; however, something new has been added. It has been designed to accept a 400 foot magazine-thus permitting long continuous runs. This is a very desirable feature because the movements of animals can seldom be predicted. Many times, long takes are necessary to capture the desired action.

The nearest competitors to either of these two movie cameras do not have as many built-in features. To equal the Bolex H8 or H16's built-in "extras" the already costly competitors would have to double or triple in price. They are also heavier and more awkward to use. On-the-spot nature photography demands a camera that is light in weight and easy to handle.

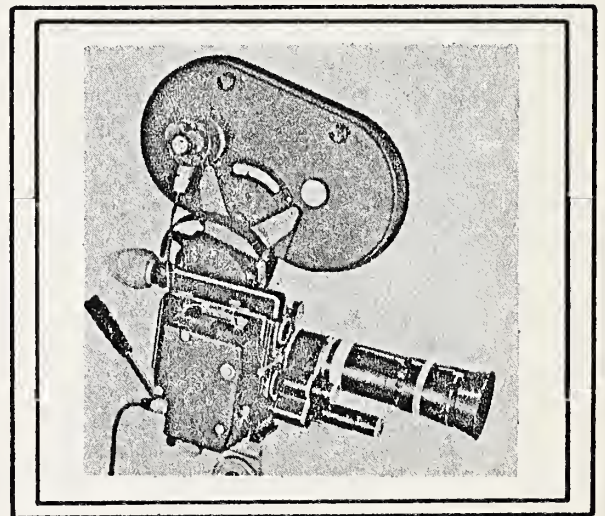


Fig 2.

The author has worked with both 8mm and 16mm films and cameras. The Bolex 16mm was the easiest to use and yielded excellent professional results.

Daniel J. Lyons, Photography Department., Natural History Society of Maryland, 2643 N. Charles Street, Baltimore, Maryland. 21218

Six lined Racerunner

(Cnemidophorous sexlineatus)

Capturing the Sixlined racerunner, and maintaining it in captivity is not as difficult as most people think. These lizards seem to turn up very seldom in local collections, even though it is prevalent in the southern counties of the western shore in our state, especially Anne Arundel County. The reason for this is that these lizards are very hard to capture once they have been spotted. The easiest way to capture Racerunners is to go out very early in the morning and catch them in their burrows which are found under rocks and logs. If this isn't feasible, there are two other methods for catching these lizards, but which require a bit more skill. One of these methods is by "noosing" the lizards with a thin cord attached to a pole or fishing rod. This method has produced excellent results, but it requires that you be within six feet of the lizard. The other method is by throwing a small net over the lizard. This has worked well for me, and it has an advantage because the lizard doesn't have to be standing still.

Once you have succeeded in capturing the lizard, the next thing to do is to set up a proper home for him. In this case, a dry, desert-like terrarium is almost a necessity. The terrarium should have at least two inches of sand at the bottom, with several rocks or branches scattered about. Racerunners will make burrows underneath these rocks or branches, and will establish a "home" very similar to the one they had in the wild. The cage should be kept in a warm place, where the temperature ranges from seventy to eighty-five degrees F. A light bulb should be placed either inside the cage or mounted onto the top. Under these conditions, Racerunners will feed very well on mealworms, crickets and grasshoppers. The lizards should be watered frequently by either spraying water onto any plants that are in the terrarium, or by running beads of water down the sides of the cage so that the lizards can lick them up.

David Saul.....1404 Haubert St.....Baltimore, Maryland.

Ed. note: Following is the first, in a series of articles by David Saul, dealing with Maryland Amphibians and Reptiles in Captivity.

News on other Herpetological Societies

Pacific Northwest Herpetological Society

Richard Cook, editor of the Bulletin of the Pacific Northwest Herpetological Society has been sending us copies of the bulletin. The bulletin will be published twice yearly and will be in our files for interested members. The issues we have received are well organized and very interesting. Anyone interested in this group can contact Dick Cook, 13 PNHS, 2015 26th East, Seattle, Washington. 98102

The Long Island Herpetological Society

Frederick C. Schlauch of the LIHS has informed us of two publications being published by this society. The Journal with emphasis on the herpetofauna of the eastern United States, and the Bulletin concerning herpetology in general. Interested persons can contact the LIHS at P. O. Box 264, East Rockaway, Long Island, New York. 11518

International Turtle & Tortoise Society, Inc.

In January of last year Mr. John M. Beattie announced the formation of the International Turtle & Tortoise Society, Inc. Their Journal, a bi-monthly magazine is devoted exclusively to the turtles and tortoises. The "International Turtle & Tortoise Society Journal will contain photographs, new, scientific data and items of interest which will appeal to hobbyist, educator and scientist alike." The society is also dedicated to the conservation and preservation of turtles and tortoises of the world. Anyone interested in this society can contact them at P. O. Box 45555, Los Angeles, California. 90045

Society for the Study of Amphibians and Reptiles

The Society will hold its 10th annual meeting September 8-10, 1967 on the campus of The Ohio State University in Columbus (local chairman, Dr. Barry D. Valentine, Department of Zoology); host institutions are the University, the Ohio State Museum, and the Columbus Zoological Society. All persons are welcome to attend.

The Board of Directors will meet Friday evening, the 8th. Paper sessions will be held on Saturday and Sunday, with an informal social gathering Saturday evening and a visit to the Columbus Zoo's new reptile house late Sunday afternoon. A symposium, "The Biology of Salamanders," will be held on Saturday, organized by Dr. Robert E. Gordon of the University of Notre Dame; the 8 participants will cover a wide range of topics, including reproductive biology, physiological ecology, systematics, paleontology, and morphology. The Museum's and the University's collections of amphibians and reptiles, as well as several private collections, will be open for study purposes. Photographic and other displays are planned. Programs will be available in late June; these may be obtained by writing Joseph T. Collins, Secretary-Treasurer, Society for the Study of Amphibians and Reptiles, 5807 Montgomery Road, Cincinnati, Ohio. 45212

Maryland Classified Paper

Number 4, June 1967

Editor - Richard Saul

Wanted: Clemmys guttata. Contact Mr. Norman Nye, % the Pet Corral,
4146 Oracle Road, Tucson, Arizona, 85705.

Services: 16mm Motion Picture and Still Photography, Natural Science
film specialists. Lykim Productions. P.O. Box 4603, Govanstown,
Baltimore, Maryland, 21212 or call D. J. Lyons 377-8865, J. G.
Kimos 866-3869.

Wanted: Rhineura for research, contact Howard W. Campbell, Neuro-
sciences, UCSD, La Jolla, California, 92038.

Wanted: Any Maryland snakes. These will be used for a display in the
Maryland House at Druid Hill Park. All specimens must be donated.
Contact: John D. Groves, Reptile House, Baltimore Zoo.

Wanted: Information or specimens of Rat snakes (Genus Elaphe). Will
buy or trade for useful specimens. Contact: John D. Groves,
3914 Hayward Avenue, Baltimore, Maryland, 21215.

For Sale: One 20" Gila Monster (Heloderma suspectum) for \$30.00. Also
have Ambystoma tigrinum for sale. Contact: David Saul, 1404
Haubert Street, Baltimore, Maryland, 21230.

Wanted: Any Maryland salamanders especially Ambystoma and Plethodon.
Also have some southwestern lizards and snakes for sale or trade.
Contact: Richard Saul, 1404 Haubert Street, Baltimore, Md., 21230.

Wanted: Southwestern United States' lizards any species; also any
European and Asian lizards. Contact: Dan Mack, 245 South
Broadway Street, Baltimore, Maryland, 21231.

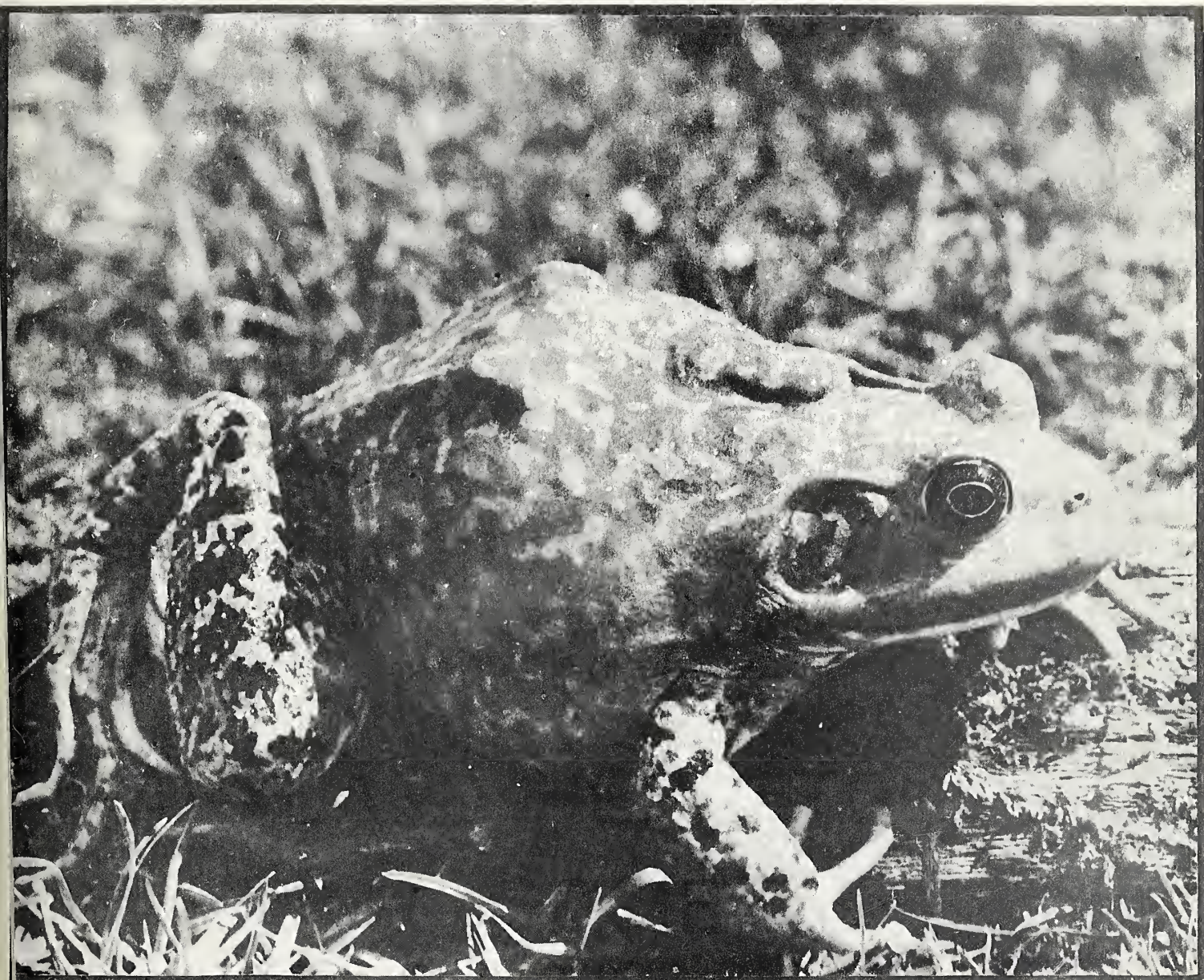
Remember: To enter the M.H.S. Emblem contest. Send all entries to
Emblem Contest, M.H.S., 2643 North Charles Street, Baltimore,
Maryland, 21218.

Send all ads to: M.H.S. Classified, 1404 Haubert Street, Baltimore,
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is \$20 a full page, \$10 a half page, \$6 a third page,
drawings permitted, smaller ads are \$.10 a word
excluding name and address.

BULLETIN of the

SEP 28 1967

MARYLAND HERPETOLOGICAL SOCIETY



VOLUME 3 30 SEPTEMBER 1967 NUMBER 3

Bulletin of the MHS



Bulletin of the Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland

Herbert S. Harris, Jr. - Advisor and Editor

James G. Kimos - Editor

Charles L. Smith - Photo Editor

Vol. 3 No. 3

30 September 1967

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Meetings: Third Saturday of each month, 9:45 a.m. at Natural
History Society of Maryland. (Except May-Aug., 8 a.m.)

The Cover: A specimen of the Bullfrog, Rana catesbeiana
Photograph by Dr. Charles J. Stine

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Ed. note: Manuscripts being submitted for publication should be typewritten (double spaced) on good quality 8½ by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by author. Reprints are available at \$.01 a page (\$.02 a page with photographs) and should be ordered when manuscripts are sent in.

Annotated Check List of

Cave-associated Reptiles and Amphibians of Maryland.*

Maryland's sandstones and limestones contain approximately forty-five known caves. Since the beds of rock are thin, there are no extensive cave systems found in the state. Crabtree, our largest cave, which is located at Savage River Dam in southern Garrett County has over a mile of passage. Most of our other caves are much smaller averaging under two hundred feet in length. Streams flow through many of these providing an excellent habitat for many organisms.

While directing the Maryland Cave Survey, I had an opportunity to sample the fauna of thirty caves. Reptiles and amphibians were the most abundant organisms in the collections. A similar survey was conducted by John Cooper (1962, Balto. Grotto News, Vol.5, NO.2, pp. 43-45) in Virginia and West Virginia. To present there has been no attempt to collect data on Maryland cave animals. The following is a report on the herpetofauna associated with the state's caves.

Reptilia

1. Elaphe obsoleta obsoleta - Black Rat Snake.
 - a) Dellingers Cave, nr. Downsville, Washington County. July 20, 1962. A three feet specimen was found on the ceiling (30 feet above the floor) of a small room in the rear of the cave. Several bats were observed near the snake.
 - b) Sand Cave, on the southern slope of Backbone Mountain, Garrett County, July 12, 1962. A large adult specimen was seen approximately thirty feet inside the entrance; possibly the snake was using this cave as a shelter from the cool, rainy weather.
2. Natrix sipedon sipedon- Northern Water Snake.
 - a) Dellingers Cave, nr. Downsville, Washington County. July 20, 1962. Two large specimens were observed under a ledge on the wet clay floor in the rear of the cave. Fifty feet from the animals there was a small slit leading to the outside at the level of the C. and O. Canal; most likely the snakes entered through this opening.
 - b) Murley Branch Spring Cave, nr. Flintstone, Allegany County. Reported by Martin Muma (1946, Md., A Journ. of Nat. Hist., 16 (2); pp. 27-32).
3. Thamnophis sirtalis sirtalis- Eastern Garter Snake. Allegany High School Cave, Cumberland, Allegany County. December 20, 1962. Freshly killed adult specimen was found five feet inside the entrance. Snow covered the ground outside the cave.
4. Terrapene carolina carolina- Eastern Box Turtle. Darby's Cave, nr. Indian Springs, Washington County. The animal was found 200 feet inside the cave (Cooper, 1960, Balto. Grotto News, 3 (10), pp. 152-58).

* Contribution No. 6 to the Maryland Cave Survey

Amphibia

5. Bufo americanus americanus- American Toad.
Devils Hole Cave, near Flintstone, Allegany County.
October 30, 1963. This toad was found in the rear of the main stream passage. Since this is a vertical cave, possibly animals use small fissures leading from the surface instead of the main passage.
6. Hyla crucifer crucifer- Northern Spring Peeper.
Devils Hole Cave, near Flintstone, Allegany County.
October 30, 1963. A spring peeper was found in the rear of the main stream passage.
7. Rana clamitans melanota- Green Frog.
 - a) Devils Hole Cave, near Flintstone, Allegany County.
October 30, 1963. Found in the rear of the main stream passage.
 - b) Rohrersville Cave, near Boonesboro, Washington County.
May 7, 1967. A large adult plunged into a pool in the entrance room from a perch on a broken stalagmite.
8. Rana palustris palustris- Pickerel Frog.
 - a) Dam No. 4 Cave, near Downsville, Washington County.
September 30, 1965. During late summer and early fall, large numbers congregate in the rear of the stream passage around a small pool.
 - b) Rohrersville Cave, near Boonesboro, Washington County.
May 7, 1967. One small individual was found in a small pool approximately 200 feet inside the entrance.
9. Rana sylvatica sylvatica- Eastern Wood Frog.
Crabtree Cave, near Savage River Dam, Garrett County.
October 2, 1961. One specimen was found at the bottom of the entrance drop.
10. Desmognathus fuscus fuscus- Northern Dusky Salamander.
 - a) Hought Cave, near Hagerstown, Washington County.
August 31, 1966. Found under a piece of wood in the twilight zone.
 - b) Rohrersville Cave, near Boonesboro, Washington County.
May 7, 1967. Many larvae were seen throughout the cave in the stream passage. Cooper (1960, Balto. Grotto News, 3(10): 152-158) reports seeing a dozen larvae in this cave.
11. Desmognathus ochrphaeus ochrphaeus- Alleghany Mountain Salamander.
Sand Cave, on the southern slope of Backbone Mountain, Garrett County. May 7, 1966. Found in the twilight zone under rocks.
12. Eurycea bislineata bislineata- Northern Two-lined Salamander.
Hought Cave, near Hagerstown, Washington County. August 31, 1966. Several specimens were found under a piece of decaying wood in the twilight zone.
13. Eurycea longicauda longicauda- Long-tailed Salamander.
 - a) Dam No. 4, Cave, near Downsville, Washington County.

- Adults found in summer to early winter; eggs in November; larvae, December to March. They are found in the rear of the stream passage.
- b) Hought Cave, near Hagerstown, Washington County. August 30, 1966. Large larva was observed in the rear of the cave.
 - c) Rohrer'sville Cave, near Boonesboro, Washington County, January 21, May 7, 1967. Small larvae were seen at various points along stream passage. Adults were noted May 13, 1967.
 - d) Sechropf Cave, west of Hagerstown, Washington County. August 30, 1966. A large population was observed in the first half of the cave.
 - e) Devils Den near Flintstone, Allegany County. (Muma, Martin. 1946. Md. A Journ. of Nat. Hist., 16(2);27-32).
14. Gyrinophilus porphyriticus porphyriticus- Northern Spring Salamander.
Rohrer'sville Cave, nr. Boonesboro, Washington County. May 7, 1967. A large larva was seen in the entrance chamber pool; the following week (May 13) a small larva was collected in the same pool.
15. Plethodon cinereus cinereus - Red-backed Salamander.
- a) Crystal Grotto Quarry Caves, near Boonesboro, Washington County. November 5, 1966. One adult and several immature specimens were collected in the rear of this small cave under decaying wood.
 - b) John Friends Cave, near Sang Run, Garrett County. Reported by James Fowler (1946. Bull. Nat. Speleol. Soc., 8, pp. 79-81).
16. Plethodon glutinosus glutinosus - Slimy Salamander.
- a) Rocky Gap Cave, east of Cumberland, Allegany County. November, 1965. Large numbers were congregating in the rear of this small cave.
 - b) Crabtree Cave, nr. Savage River Dam, Garrett County. October 22, 1966. One specimen was collected in the sewer passage, 300 feet from the entrance.
 - c) Rohrer'sville Cave, nr. Boonesboro, Washington County. May 13, 1967. Four juveniles and one sub-adult was found on the walls of the stream passage approximately fifty feet inside the entrance.
 - d) Seeler's Cave, nr. Cumberland, Allegany County. Reported by James Fowler (1946, Bull. Nat. Speleol. Soc., 8, pp. 79-81).
17. Pseudotriton ruber ruber- Northern Red Salamander.
Hought Cave, nr. Hagerstown, Washington County. August 31, 1966. One adult specimen was found "basking" on a rock ledge but immediately slipped into deep water upon our arrival.

ANOTHER WOOD TURTLE, CLEMMYS INSCULPTA, FROM THE LOWER PATAPSCO
STATE PARK, BALTIMORE COUNTY, MD.

Harris (1966), notes that although the wood turtle, Clemmys insculpta, has been collected three times in the Patapsco State Park, no specimens are existant in any recognized collection. On July 7, 1962, the author collected a wood turtle in the Vineland area of the Lower Patapsco State Park. This specimen is the fourth known from the area and the first to be placed in a permanent collection.

The turtle is an adult female. It was found lying withdrawn into its shell at the mouth of a cavity beneath a brush pile created by a stream that enters the Patapsco River about 200 feet below the lower dam on the Baltimore County side of the river. Its shell was covered with mud, as if the turtle had just emerged from the dam cavity beneath the dead brush.

An attempt was made to keep the specimen alive but it refused to feed and died during the winter. The shell, now in fragments, is presently in the herpetological collection of the Natural History Society of Maryland.

Literature Cited

Harris, Herbert S., Jr. 1966 - A checklist of the amphibians and reptiles of Patapsco State Park, Baltimore and Howard Counties, Md. Bull. Md., Herpetological Society., 2 (1): 4-7.

—Norden, Arnold , 1436 Andre Street, Baltimore, Maryland, 21230

A FIELD TRIP IN NORTHEASTERN FLORIDA

From March 25 to April 1, 1967, the author and John Groves were on a field trip in the extreme Northeastern portion of Florida. Our base camp was at Oceanway, a small town on Rt. 17 about ten miles north of Jacksonville. We arrived in Oceanway about 3:00 p.m. on the 25th. Since this was the first trip to Florida for both of us, we were eager to do some collecting. We quickly surveyed the surrounding area, and discovered a large swamp directly across the road from where we were staying. As we walked around the outskirts of the swamp, I found the first reptile of the trip. Underneath a palmetto bush, I found a male Florida Box Turtle (Terrapene c. bauri). We then started hunting a shallow portion of the swamp and found several Florida Cricket Frogs (Acris g. dorsalis) and a few little Grass Frogs (Hyla ocularis). It was starting to get dark, so we decided to leave, and return later on with our lights. As we were leaving, John flipped over an old board and found two Greenhose Frogs (Eleutherodactylus r. planirostris). When we returned, we found several large S. Leopard Frogs (Rana p. sphenoccephala) and two small Pig Frogs (Rana grylio), in addition to a large number of Cricket Frogs. Later that evening, John found a Florida Red-bellied Snake (Storeria p. obscura) under a piece of wood lying by the swamp.

The next day, the 26th, was Easter Sunday, and John and I decided that we wouldn't do too much hunting. However, we had our minds changed when we met someone from the area. This person, Bob Bourbeau, told us that every now and then he sees quite a few snakes in the vicinity of his house. About 1:00 p.m., he offered to ride us around to several places where he had seen snakes the year before. We drove to a place about a half mile from his house, then we got out of his car and walked south along some railroad tracks. About 1/4 mile south from the tracks' intersection with Eastpoint Drive, we came across a fairly large log pile. John started to remove the top logs, and within a few minutes he uncovered a Dusky Pigmy Rattlesnake (Sistrurus m. barbouri). Encouraged by this catch, we quickly went about tearing apart the remaining part of the log pile, but the only other reptiles we found were several S. Fence Lizards (Sceloporus u. undulatus) and a few Ground Skinks (Lygosoma laterale). From here, we returned to Bob's house. After awhile, we decided to poke through an old log pile in Bob's yard. Underneath the pile we found several Eastern Narrow-mouth Toads (Gastrophryne c. carolinensis), two more Greenhouse Frogs, and one Florida Chorous frog (Pseudacris t. verrucosa) and two Squirrel Tree frogs (Hyla squirella).

The following day, John and I decided to stop by at the Jacksonville Zoo. We met Russel Pyke, who is the Curator of Reptiles of the zoo, and asked him if he knew any places nearby that were fairly good for collecting. He told us that there are several places along Heckscher Drive that are quite good. It was starting to get late, so we decided not to check these places right away. As we left the zoo, we picked up a DOR S. Black Racer (Coluber c. priapus) and a Rough Green snake (Opheodrys aestivus) on the road leading into the zoo. Later that evening, John and I hunted a swamp along Rt. 17, about 1/4 mile south of Oceanway. Along the outskirts of this swamp was a large tar paper pile. We started removing the top pieces of paper, and almost immediately found a Southern Ribbon Snake (Thamnophis s. sackeni). Further searching proved to be futile, so we decided to call it quits for the day.

The next day we headed out to Blood Island, a small island off the coast along Heckscher Drive. The sky was overcast and a slight drizzle began. But the weather report called for clearing so we decided to continue. There is no bridge to the island, so we went to one of the fishing villages along the way and tried to persuade one of the fisherman to shuttle us back and forth. Finally, one of the men gave in and agreed to do it. But, we had wasted considerable time arguing, and it was almost noon by the time we got to the island. Blood island is impressive. As soon as we got there we had the feeling that snakes must be present. We surveyed the landscape, and everything seemed to fit perfectly: sandy soil, palmtrees, palmettos and plenty of gopher holes! By now the skies had cleared, and it was starting to get hot. It would have been ideal if it weren't for the wind, which came blowing across the island at about 15 mph. John and I started walking east, expecting any second to hear that beautiful,

but deadly, "buzz" of the rattlesnake. At about 1:15, we came across a fairly open area, where there were only a few small palm trees. We started across this open area, when John suddenly stopped dead in his tracks and whirled around to a small palm tree he just walked past. Then came that beautiful word "Diamondback!" Curled up around the base of the palm tree was a large Eastern Diamondback Rattlesnake (Crotalus adamanteus). The snake was indifferent toward us, and made no attempt to strike or rattle its tail until we dragged it out into the open. It was then that we ran into our problem. We had always been told that a Diamondback will back away from you when you approach it. Maybe they do, but this one sure wouldn't. We tried the prescribed technique of backing the snake into a bag, but the only direction this snake would go was forward! After trying vainly to back it into a bag, we decided to pin it. The snake was visibly tired from being maneuvered in the sun so long, so we pinned it and dumped it in the bag.



Figure 1 Crotalus adamanteus

It was now about 1:45, so we decided to quickly hunt the surrounding area. The wind started to pick up, and by 2:15 it was really unfit for hunting. We started to walk back to where the boat would pick us up, when John spotted a "hurricane" (an uprooted tree). He started walking over towards it, and when he got to the base of it he let out a scream. John was so engrossed with the hurricane that he forgot to look in front of him as he was approaching it. He had inadvertently stepped upon a medium size E. Hognose Snake (Heterodon platyrhinos), and it had struck him on the sock. When he felt the strike, all he could think of was that he had tread on a Diamondback! I don't think John will ever get over that shock! By the time we reached the mainland, it was about 4:30 p.m. We told the man that picked us up that we would probably want to go out to the island again later in the week.

As we were heading back to Oceanway, we spotted a snake on Eastport Drive. From the car, we weren't sure what kind it was, so when we circled back we both jumped out eagerly. I was delighted to find that it was a small 3' Florida Pine Snake (Pituophis m. mugitus). The snake was strongly patterned with dark chocolate brown blotches on a pearl grey background. We quickly hunted the surrounding area, but it was getting dark so we had to call it quits.

One of the other places we were told about was Ft. George Island. On Wednesday, March 29, we decided to go to this place. We managed to get an early start, and by 9:00 we were in the field hunting. As we walked along Heckscher Drive, I spotted a DOR snake lying on the road. The snake turned out to be a 2' Diamondback. We then left the road

and started hunting the surrounding area. At about 9:30, I spotted a 3' Southern Black Racer (Coluber c. priapus) sitting in a clump of palmetto bushes. I lunged for the snake and missed it. But instead of heading back under cover, the snake broke forward into an open sandy area and I easily captured him on my second try. We then walked further down Heckscher Drive. At about 10:15 I spotted a 3' E. King Snake (Lampropeltis g. getulus) lying in the grass along the road. We then left the main road and started walking up a dirt road leading into a heavily wooded area. About 11:15, I spotted an E. Garter Snake (Thamnophis s. sirtalis) crossing the road, but it disappeared into the woods.

We continued walking up the road, when I spotted something that appeared to be a snake, crossing the road. I was really surprised when this snake turned out to be a 31" Eastern Glass Lizard (Ophisaurus ventralis); a nice one. We then walked further up the road and spotted three large Broadhead Skinks (Eumeces laticeps), sunning on a pair of adjacent trees. We chased the skinks for several minutes before we were finally able to catch them. We then decided to start heading back toward Oceanway. As we were walking up the road, John spotted something sitting next to a tree. He walked over and picked up another E. Glass lizard. This one was only about two feet long, but its body length was bigger than the 31" specimen I caught. As we were returning along Heckscher Drive, we picked up a large DOR Florida Pine Snake (Pituophis m. mugitus). This specimen was a little over six feet long, and was only about 3/4 mile from the place where I caught the 3' Pine.

We then stopped by the airport to hunt an old house that lies on the outskirts of the runway. We started to hunt some old pieces of sheet metal, but to no avail. I then spotted an old log pile lying in a shallow seepage pond. We started tearing apart the top logs, and within a few minutes I found two Yellow-lipped Snakes (Rhadinæa flavilata) coiled up inside one of the rotten logs. we hunted the rest of the pile, but didn't find anything more. That evening, we did some road hunting with Russel Pyke, but the only thing we found was a 5' DOR Florida Pine Snake at the junction of New Berlin and Alta Roads .

On Thursday, March 30, we returned to Ft. George Island to hunt the same dirt road as we had the day before. We decided the place was well worth another visit, considering the luck we had the day before. We started up the road about 9:00 a.m. The temperature was already about 75 degrees, and the skies were perfectly clear. As we walked up the road, I stopped to look under a partially uprooted tree or "half-hurricane". Lying a few inches back from the opening, was a small 30" E. Diamondback (Crotalus adamanteus). The specimen appeared to be injured, and died later in the day. We walked further up the road, and at about 10:00 I spotted a large 5' Corn Snake (Elaphe g. guttata) sunning itself on the branch of an oak tree. The branch was covered with Spanish moss, and was raised about 12' above the ground. After a long climb, I was finally able to capture the snake. We then came across a construction crew working on the road. They told us that one of the men had just hit a small Diamondback with a shovel, and the snake crawled inside a rotten log. John went down the road with one of the men to see if he could find the snake.

In a few minutes he returned with a small Diamondback , almost the same size as the one I had just found. But, the snake was apparently severely injured, because it too died later on. As we walked further up the road, John came across a large Southern Black Racer (Coluber c. priapus) sitting along side an old tar paper pile. We both started to hunt the pile, but the only additional herpetofauna we found were a few Narrow-mouth Toads (Gastrophryne c. carolinensis) and a couple Greenhouse Frogs (Eleutherodactylus r. planirostis). Further collecting on the road yield six more Broadheads (Eumeces laticeps) and a few S. Swifts (Sceloporus u. undulatus). That evening we again hunted the log pile in Bob Bourbeau's yard, and we found seven more Narrow-mouth Toads and three more Greenhouse Frogs.

On Friday, March 31, we decided to return to Blood Island. The weather conditions were fairly poor, but we decided to go anyway. We made sure that we would get an early start, and by 8:45 we were in the boat heading out to the island. We started walking towards the place where we found the Diamondback, when we came across a snake trail in the sand. It appeared to be very fresh so we decided to follow the trail, each of us going in opposite directions. I followed the trail for about ten yards, and then I came across the reptile making the tracks. Sitting in the middle of an open spot was a large impressive looking Hognose Snake (Heterodon platyrhinos). Encouraged by this find, we pressed on at a more rapid pace. In about an hour, John found another large E. Hognose Snake (Heterodon platyrhinos) sitting out in the open. We were both confident that this was going to be a good day after this catch, but a few minutes later the wind started to pick up. It was fairly windy to start with, but when the "breezes" started coming in at 35 mph. we decided to stop. We did manage to find a few Greenhouse Frogs (Eleutherodactylus r. planirostis) under an old board, and several Anoles (Anolis c. carolinensis) sitting on the bases of palm trees, but the wind completely ruined any chances we had of catching any snakes. So, for the remaining portion of the day we just sat on the beach and waited for the boat to come.



Figure 2 Heterodon platyrhinos starting to play dead.

Saturday, April 1, was our last day in Florida. We were fortunate in that Bob Bourbeau was able to go hunting with us this day. We decided to return to Ft. George Island, and by 8:30 we were collecting. We decided to hunt the road a little differently this time, since we had a jeep with us. John and I took turns riding the hood of the jeep as we slowly cruised down the road. A little way down the road I spotted the first reptiles of the day. In a tree along side

the road were two large Broadhead Skinks (Eumeces laticeps). The lizards were about ten feet off the ground, which would normally have put them out of our reach. But not so, today! Bob drove his jeep right up to the tree, and by using the roof of the jeep for a standing support, we were able to catch both of the broadheads. John caught a male about 12" long and I caught a female about 10" long. We then drove a little further up the road, when John spotted a snake disappearing into the woods. He jumped from the jeep and dove for the snake and came up with a 3' E. Garter Snake (Thamnophis s. sirtalis)



Figure 3 John Groves collecting Eumeces laticeps.
Ft. George Island, Fla.

A little further down the road John found a large S. Black Racer (Coluber c. priapus) sitting in a clump of palmettos. We continued driving, and at about 10:30 I spotted a 3' Yellow Rat Snake (Elaphe o. quadrivittata) protruding from a hole in the side of an old tree. In order to get to the hole, John again employed the roof of the jeep. Using a lasso, he finally got the snake. As we drove along we spotted Broadheads everywhere. They were always basking in the sun on the sides of trees, and usually were from six to eight feet off the ground. On this day alone, we came across sixteen of them. About 1:00 p.m. we spotted another skink sitting on the side of the tree. The skink also had a bright orange head, but was only about half the size of the ones we had been catching. It turned out to be a S.E. Five-lined Skink (Eumeces inexpectatus) and was the only one we had seen the whole week.

A little later, I picked up a few Anoles (Anolis c. carolinensis) crossing the roads, and spotted many more of them scurrying up the sides of palm trees. Since John and I had a bus to catch later that afternoon, we decided to return to Oceanway. On the way back, we picked up a large DOR S. Black Racer (Coluber c. priapus) and then we stopped by the zoo to say good-by to Russ.

David Saul, 1404 Haubert Street, Baltimore, Maryland

Ed. note- The above account was taken verbatim from the field notes of David Saul.

EARLY SPRING FEEDING BEHAVIOR OF RANA
CATASBEIANA

In March and early April of 1962 and 1963 the author collected several series of frogs which were later to be used in the Zoology classes of Wesley College. The collection site, 10 mi E. Dover, Kent County, Delaware, consisted of several small farm ponds and surrounding pastures which had become temporarily flooded. Hyla crucifer, Pseudacris triseriata, Rana pipiens, Rana palustris, and Acris crepitans (in order of relative abundance) were found in congresses of various sizes, their numbers depending on the date and specific site. Several representatives of each species were retained for my private collection. (These specimens have since been deposited in the collection of Florida Southern College, Lakeland, Florida.)

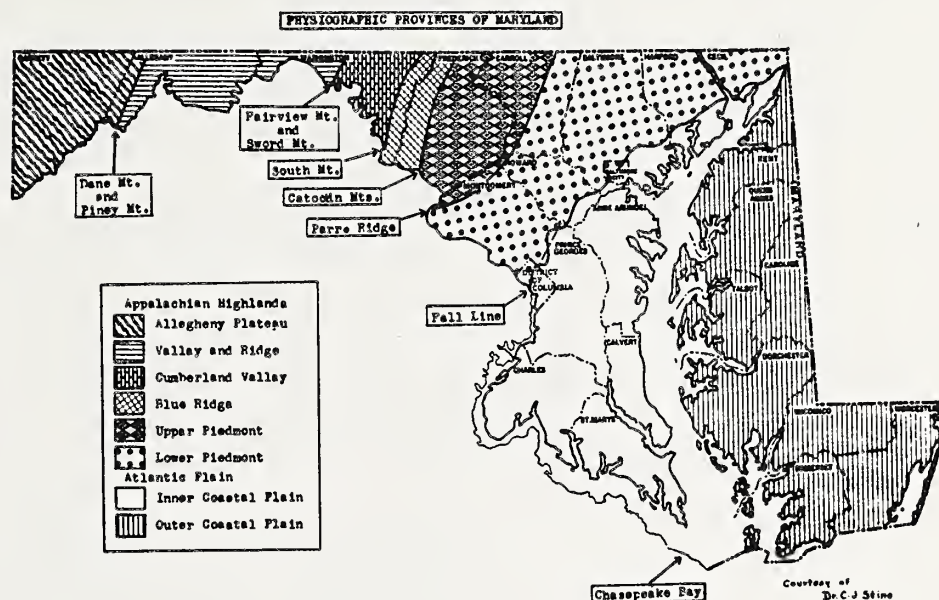
For the most part, the activities centered around capturing adult bullfrogs to be used in Zoology labs. Numerous specimens were found lying on the bottom of the flooded pastures which were connected with more permanent, or at least deeper, ponds. Although these frogs were difficult to locate due to the heavy vegetation, the actual capture consisted of nothing more than picking up the sluggish frogs. At the time it was concluded that they were in a state of hibernation, and although they would slowly swim across the bottom if they were violently disturbed, for the most part they appeared numb and lifeless.

Several dozen specimens were collected and preserved. Months later the frantic butchering techniques of the students revealed that the stomachs of all these frogs were packed with varying combinations of the anurians listed above. The actual percentage of each species ingested appears to roughly correlate with the relative abundance of these species at the breeding ponds, thus indicating little, if any, preference. Also found in the stomachs, in addition to these five frogs, were several larva of Ambystoma opacum. These amphibians would appear to be an important factor in the survival of R. catesbeiana, enabling the species to live through the long period between its emergence from hibernation and the first major appearance of insects in May.

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SOME PROBLEMS IN MARYLAND HERPETOLOGY

The following list, in part, was prepared a number of years ago by Charles J. Stine. We have gone over it and deleted and added numerous items. We realize that it is by no means a complete list of the Problems in Maryland Herpetology but hope that it will give our members a place to start. Also inclosed is a Map of Maryland showing the physiographic provinces.



1. Is Plethodon g. glutinosus in the Maryland Coastal Plain Province?
2. Is Eurycea l. longicauda in the Maryland Coastal Plain Province?
3. What are the characteristics of the Hyla cinerea of the upper tidewater Potomac and are these characters any different than those of the cinerea in other parts of the state?
4. Is Hyla andersoni on the Delmarva?
5. Is Rana virgatipes in Southern Maryland?
6. Where does Ambystoma t. tigrinum winter?
7. Is Necturus m. maculosus in Western Maryland with Cryptobranchus a. alleganiensis?
8. Is Plethodon wehrlei in Western Maryland?
9. Is Ambystoma jeffersonianum in the Piedmont Province? (at Conowingo?)
10. Is the Hyla femoralis record for Calvert County valid?
11. Is Siren lacertina in Southern Maryland along the Potomac?
12. Is Pseudacris t. feriarum replaced by Pseudacris brachyphona on the Alleghany Plateau of the Appalachian Province?

13. Is the range of Gastrophryne c. carolinensis more continuous in Southern Maryland than present records would seem to indicate?
14. Is the Pseudacris in the Delmarva different from the feriarum in the rest of Maryland?
15. At present, how well is Crotalus h. horridus established in the Piedmont lowlands Province? (Pretty Boy Dam?)
16. What is the range of Eumeces anthracinus in Garrett County? (Is it in Allegany County?)
17. Is Farancia erythrogramma more abundant then believed?
18. Is Pituophis m. melanoleucus on the Delmarva?
19. Does Pseudotriton m. montanus occur in the Piedmont of Maryland.
20. Is Eurycea gluttolineata in Maryland?
21. Are the old accounts of Trionyx s. spinifer from Maryland valid?
22. Is Ambystoma t. tigrinum as rare on the western shore as it appears to be?
23. Are both Pseudemys f. floridana and P. c. concinna indigenous to Maryland; What are their ranges in the state?
24. Does Acris occur on the Allegheny Plateau?
25. Does Desmognathus monticola cross the Potomac River into Maryland's Blue Ridge?
26. What is the distribution of Lampropeltis g. getulus on the Piedmont?
27. What is the distribution of Scaphiopus on the Piedmont?
28. Is Gyrinophilus p. porphyriticus in the lower Piedmont?
29. What is the distribution of Haldea v. pulchra and the nominate subspecies in Maryland?
30. What is the distribution of Desmognathus in Western Maryland?
31. What is the precise area of intergradation between Lampropeltis d. triangulum and Lampropeltis d. temporalis in Maryland?

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DRY SEASON IN THE TROPICS

When the almost daily rains end in December or early January, a noticeable change soon comes over the tropical terrain. The rich green-colored jungle slowly turns to brown as leaves begin to cover the ground like a typical New England autumn, and the full, muddy streams give way to clear, shallow trickles. From the herpetologist's point of view, the dry season is hardly as exciting or productive for collecting as it is during the rainy season. Lizards are probably more abundant, such as ameivas and anoles, but little of anything else can be found more commonly and many of the amphibians are seldom seen.

My first opportunity to get out into the field during the 1967 dry season came on February 11. I started out at about 8 a.m. heading along Rt. K9 from Cocoli, Canal Zone. Leaving the road, I followed a small trail into the woods and near the edge of a section of the Rio Cocoli collected my first specimen, an Anolis limifrons sp. The lizard had a total length of 131 mm. and a body length of 47 mm. Returning to the road I picked up a Bufo typhonius as it slowly hopped along, and soon afterwards came across an Enallia flavitorques. The snake showed no external injuries but apparently had been hit by a car, for it died the same day. Ameivas were quite frequently seen along the sides of the road or occasionally dashing across the road itself, but were too fast to capture. I soon left the road again and followed a stream into the jungle. This eventually flowed into a very large stream, which was the source of the Rio Cocoli. Basilisks were sunning commonly, but quickly darted across the water when approached. I next found a small Eleutherodactylus fitzingeri and two more Bufo typhonius along the stream. At one point I began chasing a small basilisk up a hillside and in the process caught sight of an Anolis limifrons sp. on a log. The latter I caught and measured. It has a body length of 38 mm. (the tail was broken).

After some time, I worked my way back to the road, where for awhile all I encountered were ameivas. I then started to chase after one along side of the road and it led me to a Vine Snake, Oxybelis aeneus in the bushes. I quickly grabbed it. I then continued back along K9 to some ponds where I had collected Pseudemys brnata during 1966. This was the first time I had been there in a couple of months, and I found the smaller bodies of water where I had previously obtained the turtles dried up. I concluded my first collecting trip of the dry season along a near-by stream, observing several more lizards (mostly basilisks) and picking up a final Bufo typhonius.

My next outing was on a cloudy February 22. Starting out at 8:30 a.m. I noticed a Marine Toad, Bufo marinus, in a drainage ditch en route to Cocoli, where I began by following a stream into the jungle from Rt. K2. Numerous basilisks were seen running along

the water or up hillsides along the stream, and one male Gecko, Gonatodes fuscus, was seen in a tree. A number of small Bufo typhonius were taken along the stream, and one Engystomops pustulosus. Along a dry portion of the stream a Teiidae, Gymnophthalmus speciosus, was seen in the grass. The stream eventually led to Rt. K9, where I followed the road in the same manner as my last trip. Ameivas were common and an Anolis was missed. At one point I peeked into a drainage pipe under the road and found it filled with bats, many hanging from the ceiling of the pipe and others flying endlessly back and forth.

Continuing down Rt. K9, I next saw a small, brown snake slide into the leaves at a small pool, but could not identify it. Immediately afterwards an Anolis limifrons sp. (129 mm. total length and 42 mm. body length) was caught, and showed its displeasure in being captured by biting the author on the finger twice. The only specimens seen after this were more ameivas.

On March 5, I made a brief evening trip to the same area. Just before sunset a large Pseudemys ornata was seen on a log in an inlet of the Rio Cocoli. After dark I followed a stream into the jungle, finding a fresh-water eel and a small Eleutherodactylus fitzingeri. A couple of small Leptodactylus were also seen or collected.

On the 25th of March, another collecting trip to the Cocoli area yielded an adult Oxybelis aeneus at 10 a.m. This was along a side road near the top of a steep hill. Later, following a dry stream bed along a wooded revine, I observed a juvenile Ameiva leptophrys. The lizard started to run up the side of the ravine so I tossed a rock in front of it whereby it immediately turned and headed back towards me. The specimen finally dashed under some leaves not far from my feet, so I easily caught it. Another Vine Snake, Oxybelis aeneus, was my next catch, this at 11:45 a.m. along a large stream. It was followed by the catch of another Bufo typhonius. In addition to the specimens collected, I also saw a couple of Eleutherodactylus fitzingeri, several basilisks and one or two iguanas.

Some Snakes Of Panama

Boa constrictor

Only three DOR specimens were seen between May 1966 and May 1967, though I did hear reports of several live individuals. The first DOR Boa I found was on July 23, 1966 at Fort Kobbe, Canal Zone, on a road between the woods and a golf course. It was about $1\frac{1}{2}$ feet in length. The second snake was about $2\frac{1}{2}$ feet in length and was found along side of Rt. K2 at Cocoli, Canal Zone on September 10, 1966. The third DOR Boa was about 2 feet in length and found along a road at Fort Kobbe, Canal Zone on May 20, 1967 only yards from where the DOR specimen was found on July 23 of the previous year.

Drymarchon corais

This is the Panamanian form of the Indigo. I encountered one specimen on March 12, 1967 in the woods along a dry stream bed at Fort Kobbe, Canal Zone. The snake was about 5 feet in length, brownish-gray in ground color, with a solid black tail. Its head was light-colored (somewhat resembling that of a Bull Snake) with several black streaks below the eye. It was a fairly thick snake, and quick-moving, escaping down a hole beneath the roots of a tree stump.

Enulius flavitorques

Enulius flavitorques (Fig. 1) is a small, secretive ground snake, light brown in dorsal coloration and light-colored below. A prominent feature is a yellow band behind the head. Though not especially rare, they do remain hidden much of the time, and my only specimen from May 1966 to May 1967 was the individual mentioned from near Cocoli, Canal Zone on February 11, 1967.



figure 1. Enulius flavitorques, Cocoli, Canal Zone

Oxybelis aeneus

The Vine Snake (Fig. 2) is light brown above, with the ventral area and lower half of the head white to yellow. I observed my first specimen in the grass near a pond at Cocoli, Canal Zone on June 26, 1966 but did not catch it. In the same area on September 4 the head of a specimen was seen poking up through some sticks and I quickly grabbed it. The latter was taken at 5:45 p.m. As already mentioned,



figure 2. Vine Snake, Oxybelis aeneus, from Canal Zone.

three specimens were collected during the first few months of 1967, One on February 11, and two on March 25.

Ungaliophis panamensis

This is a rather rare, small member of the Boa group, of which one DOR specimen was found by the author on July 23, 1966 at Fort Kobbe, Canal Zone. The snake, which was orange in coloration and without prominent markings, was presented to Charles W. Myers for the University of Kansas preserved collection.

Coniophanes joanae

Myers (1966) recently described this species for the first time, from a cloud forest (Carro Pirre) in eastern Panama. His notes state: "I found the holotype in the cloud forest early in the morning when the air temperature was 60° F and before the sun had warmed an occasional patch of forest floor. It was stretched motionless on the ground, presumably having been disturbed in its foraging, and was fairly slow and deliberate in its movements when picked up. That this sluggishness was not due to cold was evident after the specimen had been carried to Panama City, and still moved with the same deliberateness in an air temperature of 80° F; it made no attempt to bite. The tail was somewhat prehensile, being capable of supporting the body weight, and coiling about one's fingers when the snake was held."

Description: "A diminutive Coniophanes differing from most of its congeners in having 17 anterior and midbody rows of dorsal scales (instead of 19 to 25 rows), and differing from all in the following combination of color and pattern: Brown above with brown supralabials and a light postocular stripe across corner of mouth to nape; a dark line on the 4th scale row and a dark streak on the vertebral and paravertebral rows extending length of body and continuing conspicuously as tail stripes; ventral surfaces orangish brown, mottled with blackish pigment and with a dark transverse streak at base of each ventral and subcaudal plate."

Micrurus nigrocinctus (POISONOUS)

The remains of a DOR Coral Snake was found in late August, 1966, along a dirt road through the jungle at Fort Kobbe, Canal Zone. An AOR Coral (Fig. 2.) was found along the same road at 7:30 a.m. on October 15, 1966. When approached it did not attempt to bite, but merely tried to crawl away into the brush at the side of the road.



Fig. 3 Coral Snake, *Micrurus nigrocinctus*, from Fort Kobbe, Canal Zone

Lachesis muta (POISONOUS)

The Bushmaster is known locally as the verrugosa" (warty one), the "cascabela muda" (silent rattlesnake), or sometimes "mapana". It is the longest and heaviest viper of the Panama region, being oval-headed and having a tan dorsal coloration with dark saddle-like markings. It is also the most poisonous snake in Panama, though actually quite rare, especially the young. The latter, after hatching from eggs, apparently exist in underground burrows where they hunt small rodents.

Bothrops atrox (POISONOUS)

The Fer-de-lance is much more apt to be encountered in Panama than the Bushmaster, hence could be considered the more dangerous of the two. It often frequents plantations in search of rodents and may be seen in the jungle either during the day or at night. Common names are "barba amarilla" (yellow beard), "Terciopelo" (velvet skin), and "equis" (because of its X-like dorsal markings). The Fer-de-lance is slender, dark above, with light yellowish to light gray blotches. It reaches a length of about 5 feet. The head is lancet-shaped, another typical characteristic. This species is viviparous, and the newly born young are aggressive and, of course, just as dangerous as the adults.

Bothrops lansbergii & B. nasutus (POISONOUS)

These are the Hog-nosed Vipers, commonly called "patoca" or "tamaga". One, lansbergii, occurs on the Pacific side of Panama and the other species, nasutus, is found on the Atlantic side. The tipped-up nose is more prominent with nasutus. They are dark brown or black with faint brick red rhomboid markings and 12-18 inches in length.

Bothrops schlegelii (POISONOUS)

This is the most common of several Panamanian Tree Vipers, locally known as the Horned Palm Viper, the Eyelash Viper, "bocaraca", "toboba de pestamas", or "orapel". It is small (10-14 inches) and sometimes stocky with a prehensile tail, and, naturally has its characteristic "eyelashes". The coloration varies from olive green or yellowish, with dark specks, to almost black with a pinkish dorsal pattern.

Two other Tree Vipers without the eyelashes are Bothrops lateralis, which is greenish with light stripes along its sides, and Bothrops n. nigroviridis, also having a greenish hue but speckled with black. Length of each is 18-30 inches.

Bothrops godmani (POISONOUS)

Godman's Viper is a small, thick-bodied ground viper, black in color, and about 18-22 inches in length. It apparently does not strike too often, and has been found at elevations up to about 4,000 feet.

Bothrops nummifer (POISONOUS)

The jumping Viper is small (10-20 inches), dart-headed, and heavy-bodied. It is also called "Timbo" and "mano-de-piedra". A vicious-striking snake, it frequents rocky elevated situations.

Pelamydrus platurus (POISONOUS)

This is the common Sea Snake of the Panama coast. It is black with orange patterns on the side and belly, and has a length of 12-24 inches. In the Bay of Panama it is reported to be fairly abundant.

Notes on Additional Species

Ameiva leptophrys

Ameiva leptophrys (Fig. 4) of which one specimen was previously mentioned, differs from Ameiva ameiva in that the former does not have stripes on the sides as A. ameiva (especially the juvenile) does. Too, leptophrys has a somewhat lighter area down the center of the back. Ameiva leptophrys is found in combination wooded and open habitats, whereas A. ameiva more often frequents low and open situations.



Figure 4. Ameiva leptophrys from Cocoli, Canal Zone

Anolis limifrons sp.

Anolis limifrons sp. (Fig. 5) is the name applied to an anole which differs from Anolis limifrons slightly in appearance but has the characteristic features of smooth belly ventrals, and yellow on the dewlap. It might be added that the Anolis of Panama have never really been studied and keyed out yet, and different names are sometimes applied to the same species (or the same name to different species) by various authors. In some cases no names at all, hence the term sp. is used.



Figure 5. Anolis limifrons sp. from Cocoli, Canal Zone

Geochelone carbonaria

Geochelone carbonaria (Fig. 6) is a large land tortoise of Panama, and is quite frequently used for food by the Indians of the San Blas Region. During February 1967 Charles Myers obtained two of these tortoises while doing field work in that area. One individual, which was about $5\frac{1}{2}$ inches in length, was caught in a trap (set up for rats) baited with banana and given to the author. The locality was Camp Sasardi, on the mainland abreast of Isla Mulatupu, elevation 12 meters.

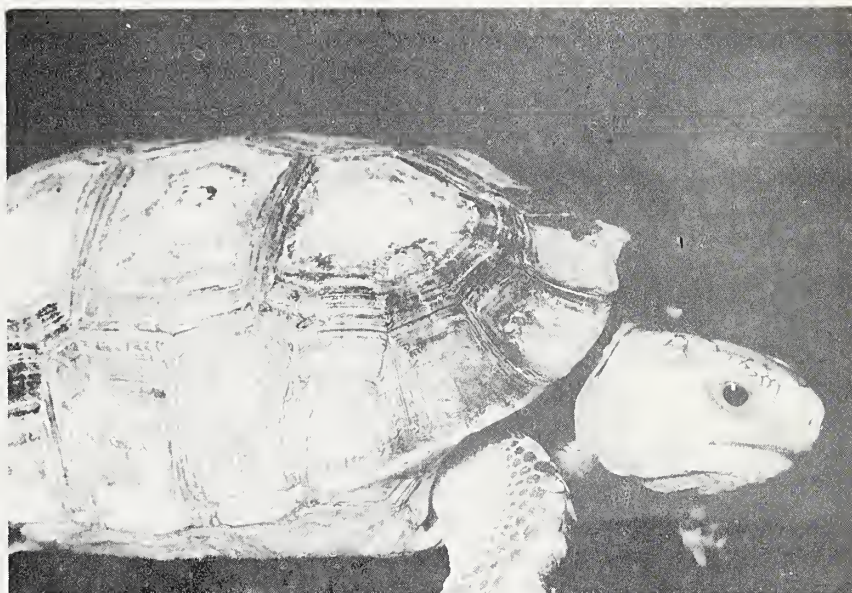


Figure 6. Geochelone carbonaria from San Blas, Panama

Hyla crepitans

Hyla crepitans (Fig. 7) was taken twice during my first year in Panama, the first time on August 26, 1966 at Fort Kobbe, Canal Zone. The specimen was on a reed along side a jungle road (a small rain pond was contained in the brush nearby) when taken at 10 p.m. The second individual was found on October 2, 1966 on a reed, about chest-high in a flooded area near Cocoli, Canal Zone. This species is tan in coloration with a thin line down the center of the back, and hash-bar markings on the side.

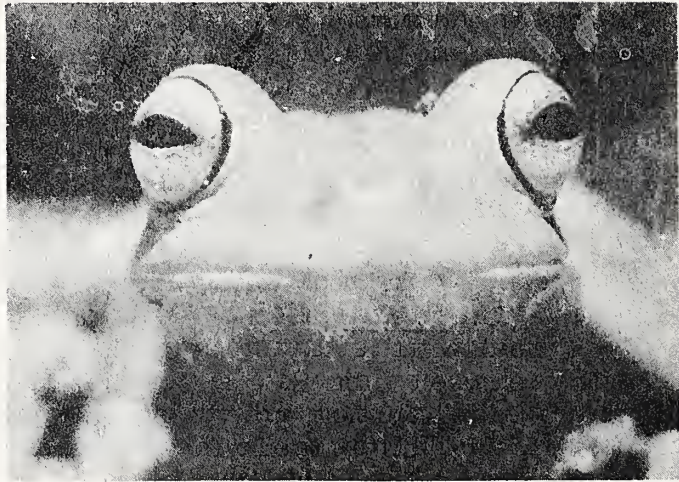


Figure 7. Hyla crepitans from Fort Kobbe, Canal Zone.

Engystomops pustulosus

Engystomops pustulosus is a small frog of the Family Leptodactylidae that is seen often from about the middle of May, through December. It frequents a variety of habitats, including drainage ditches, small streams, the edges of ponds, rain puddles, or any wet grassy or flooded area. The general coloration is dark brown above, but its main characteristic is a belly heavily marbled with black. A thin line is present down the center of the neck and chin and is especially apparent when the vocal sac expands. Incidentally, when calling, not only the vocal sac, but the entire little frog seems to puff up as well. It is most common at night, though frequently found during the day in wet situations, such as in the damp grass of a golf course after a rain. At the time I am writing this (May 13, 1967) I have just returned from a morning collecting trip into the jungle, and have picked up three individuals from 8 a.m. to 8:30 among the wet leaves of a stream bed (it rained most of yesterday so the jungle was still fairly wet). Intermittent pools along the stream bed contained an abundance of tadpoles, possibly some from this species. An enemy of the frog would no doubt be the mud turtle, Kinosternon scorpioides, as I also found three of these turtles in three separate pools - a male 120 mm. in length, a 112 mm. female and a young individual 29 mm. All three were lying motionless along the bottom, in which situation careless tadpoles would certainly be easy prey.

Key to Canal Zone Engystomops

- A. Warts circular; belly light marbled with gray; toes webbed
at base.....ruthveni
- AA. Warts linear; belly heavily marbled with black; toes free...
.....pustulosus

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Ken Nemuras, P.O. Box 480 , Howard AFB, Canal Zone

Another Rainbow Snake, Abastor erythrogrammus, from
Maryland

Abstract

A fourth authentic Maryland specimen of the fossorial rainbow snake is reported from Newburg, Charles County. An adult female 930 mm. long, it is the only complete specimen now in collections from Maryland. Biological data for the specimen and the ecological aspects of this species in Maryland are discussed.

An adult female rainbow snake, Abastor erythrogrammus (Latreille), was found DOR (dead on road) in near-perfect condition on the sandy east shoulder of U.S. 301 approximately 1.4 miles NE of the Potomac River Bridge, near Newburg, Charles County, Maryland, by Joseph Kilmon and Ray Merson, on July 10, 1960, ca. 7:30 p.m. (DST). This interesting find occurred exactly 23 years to the month after the first and only specimens known to have been taken in Maryland were found (McCauley, 1939:54). Muscle contractions and uncoagulated blood coming from the mouth indicated that the snake had been killed shortly before it was found, apparently moving across the heavily-traveled highway at dusk. Dissection revealed the sex and the fact that the snake had been struck at mid-body, where the vertebrae and ribs were shattered and part of the elongate liver had been destroyed. There were no recognizable food materials in the stomach or intestine. No eggs were found, although in the more northern part of its range Abastor apparently performs oviposition in early July (Richmond 1945:30).

The snake, No. R3012 in the herpetological collection of the Natural History Society of Maryland, measures 930 mm. total length, of which 123 mm. (13.2%) comprises the tail. It has 174 ventrals and 38 caudals (sum 212), including the horny end scale, 6 upper labials, 8 lower labials, scale rows 19-19-19 and a divided anal plate. Head scutellation is normal for the species and the cephalic plates are marked with red. The chin and upper labials are light (probably yellow in life), and lower labials 1 through 5 and the chin shields are spotted with black. The lateral red stripes are at the level of the 6th scale row, barely encroaching on the 7th. The mid-dorsal red stripe is made up of roughly arrow-shaped markings on each scale of row 10. It is continuous from the parietals to the level of the 6th caudal (from the anus). Scale rows 1 and 2 are pink-red and the lower half (diagonally) of the 3rd row is light pink. Near the head, at the level of the 5th ventral scute, the 3rd row of scales and part of the 4th is light in color. There is a row of large black spots at the edge of each side of the ventrals, and a mid-ventral row of black spots running from the 29th ventral scute (counting from the head) to the 4th. The rest of the venter is pink.

Reprinted from Chesapeake Science 1 (3-4): 203-204.
December 1960 with the author's permission

The original Maryland specimens were taken on the Stump Neck peninsula, Charles County, in July, 1937 by Civilian Conservation Corps workers building a road. One was accidentally dug from sandy soil; the other two were found under stumps. That this species is markedly fossorial is well known. Thus Cope (in Wright and Wright, 1957:84) reported specimens from the Pamunkey River, Virginia, dug from a clay bank under ten feet of sand, and Florida specimens dug from nearly equal depths in sand. Richmond (1945) found that the majority of specimens taken in Virginia were plowed from the ground. Only the skin of one of the Maryland specimens, headless and tanned, was retained. It apparently resided in the possession of Mr. Howard Hassler of Washington D.C. as late as 1945 (McCauley 1945:57). I have not attempted to trace this skin, but McCauley (1939, loc. cit) gave the following description: ventrals 162, caudals 36, total length 995 mm. (headless) tail 175 mm. scale rows 17-19-17. The sexual dimorphism data presented by Richmond (1954, loc. cit) indicate that this specimen was a female containing an undetermined number of eggs, and the specimen was probably taken early in the month of July. The locality from which the current specimen was taken lies on a peninsula approximately 2.5-3 miles wide between the Potomac River and the headwaters of the Wicomico River. Tributary streams from Allens Fresh Run to the east and Clifton Creek to the west enter the immediate area where the snake was found.

In Maryland Abastor is second in rarity only to the northern pine snake. Pituophis melanoleucus melanoleucus (Daudin), which, indeed, may not be a legitimate member of the local herpetofauna. It had long been looked upon by many local workers as another of those forms which, like Pituophis, Siren lacertina, and Hyla femoralis, would probably never be seen again in this state. However, it is likely that Abastor is actually more abundant in Maryland than the paucity of known occurrences would indicate. Throughout the main part of its range this secretive snake is principally nocturnal and crepuscular and is consequently fairly difficult to find. Only more exhaustive investigation in the Potomac lowlands of Charles and possibly St. Mary's Counties could unearth further Maryland specimens

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ED. Note: Except for a recent name change this paper is up to date. In 1964, Mr. Wilfred T. Neill (Amer. Mid. Nat. 71 (2): 257-295) proposed the new name Farancia e. erytrogramma.

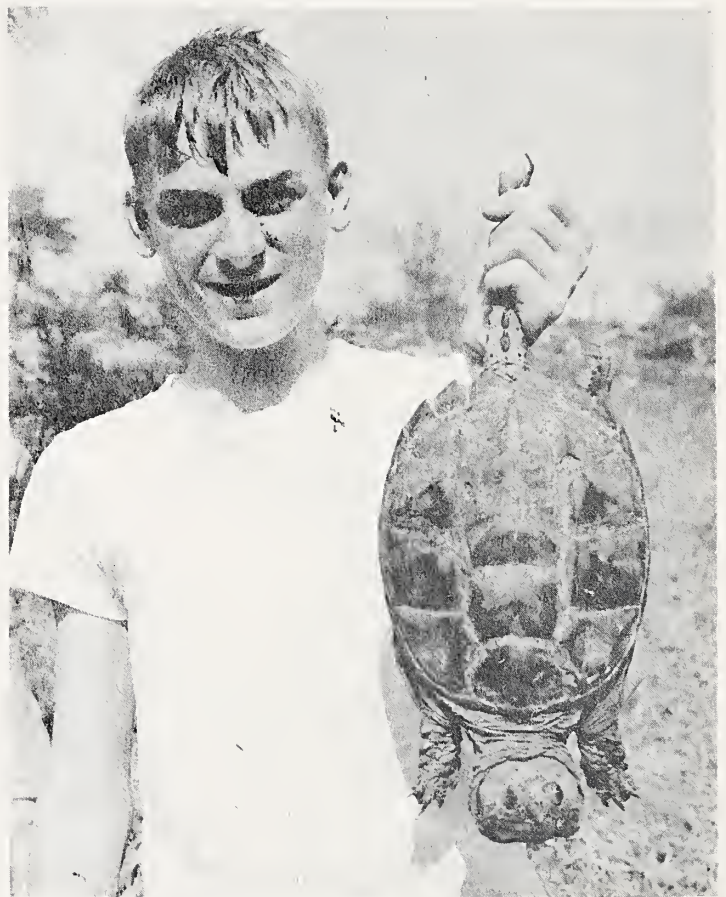
MHS Field Trip # , May 1967, to St. Mary's County , Maryland

Below are a group of photographs taken by D.J. Lyons on the May, 1967 field trip to St. Mary's Co., Md. The highlite of this trip was a nice Elaphe g. guttata taken by Robert Tuck, Jr. of the United States National Museum.

Members observing a
turtle buried in the mud.



Martin Long showing a snapping
turtle he collected.



Mr. David Kramer shows us
"technique" in overturning
boards. Notice the physique.

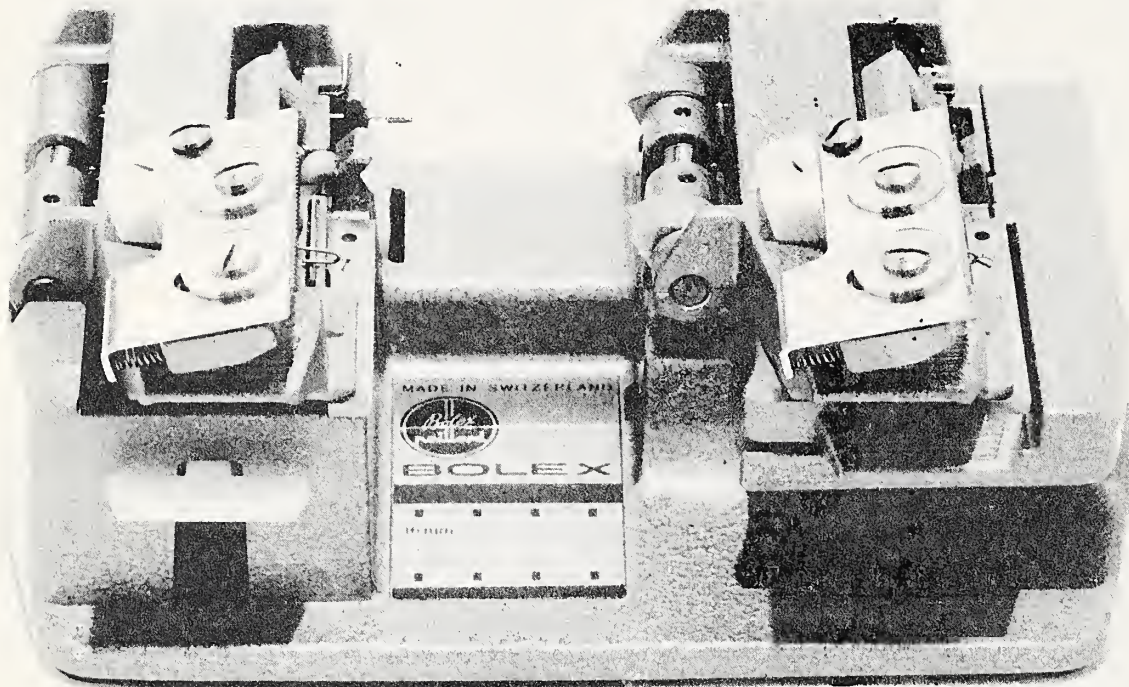


Our "beloved" group
picture



A NEW TOOL FOR THE SERIOUS AMATEUR CINEMATOGRAPHER

Amateur cinematographers have always wanted a splicer that would do a professional job, yet retail at a price they could afford. BOLEX has recently marketed such a splicer. This newcomer to the cine-world is a precision product of Swiss engineering. Its light weight and small size are not to be mistaken for signs of weakness - it has been designed for daily use. This splicer is portable and can be used anywhere, or fastened to an editing bench by means of two bolt holes in its frame. It produces a splice that has a beveled edge and that ends on the frame line. This type of splice has decided advantages. The beveled edge makes a splice that is click-free when projected because the film thickness remains the same. This uniform thickness is also desirable if spliced film is to be magnetically stripped, because it minimizes the loss of recording head contact with the stripping at the splice. Since the splice ends at the frame line, this splicer may be used in the preparation of A and B rolls. When original footage is edited in this manner, it will yield a print that is free from both physical and visible splices.



The author has tested this new splicer and found it more than satisfactory. Many test splices were made on old footage. The locks held the film firmly in place while the scraper blades worked with a smooth and positive action - the blades scraped clean and true. Several different scenes were then spliced together and projected. They were indeed click-free. A and B rolls were then prepared from a single long scene. The print that was made from the A and B rolls was projected and found to be very satisfactory from a professional "view" point. The film cement was applied with a special applicator

that comes with the splicer. This device, when properly used, applied the correct amount of cement to the splice area. This prevented excess cement from oozing out and causing a "dirty" splice. At no time did any of the splices separate or cause a loop loss in the projector. The BOLEX 16 mm. splicer will, undoubtedly, become a standard piece of equipment with cinematographers who want quality results at reasonable cost. It retails at \$37.50.

Daniel J. Lyons Director , Department of Photography, Natural History Society of Maryland, 2643 N. Charles Street, Baltimore , Maryland, 21218.

BOOK REVIEW -

POISONOUS SNAKES OF THE EASTERN UNITED STATES
WITH
FIRST AID GUIDE

"Poisonous Snakes of the Eastern United States with First Aid Guide" is a 20-page pamphlet by Harry T. Davis. Mr. Davis has taken information from authoritative sources on this subject and condensed it into an easily readable guide. The work discusses the six poisonous snakes that are found on the East coast. It gives enough scientific data to enable the average reader to converse intelligently with a herpetologist. However, range, habit and description of the serpents are presented in a way which is understandable to the layman.

A total of ten photographic plates have been used to illustrate the pamphlet. The four color plates of which three are used are of good quality, fit well with the text. The last which appears in the work is of poor quality and should not have been used. There are six black and white plates that are good enough to be used for positive identification of the poisonous snakes they represent. It must be mentioned that there are color and black and white photographs available that are superior to those used in the pamphlet. The only exception is the cover, which is eye-catching, truthful and educational.

The section on first aid for snake bite discusses two methods of treatment: the Tourniquet, Cut, Suction Method (TCS) which is well known, and the Tourniquet and Cryotherapy Method (TC) which has not won general acceptance. Both methods of treatment are acceptable as emergency measures. Mr. Davis mentions the use of antivenin for poisonous snake bite and stresses its importance along with proper medical attention.

Generally speaking, the pamphlet is well illustrated and has a good text. People who spend a great deal of time in the out-of-doors should obtain a copy, read it and keep it handy for reference. "Poisonous Snakes of the Eastern United States with First Aid Guide" by Harry T. Davis may be purchased for 25¢ from the North Carolina State Museum, Box 2881, Raleigh, North Carolina 27602.

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Change of Address: Pacific Northwest Herpetological Society
c/o Patt Wagoner, Secretary
1075 Summit Avenue, East
Seattle, Washington, 98102

Maryland Herpetofauna in Captivity

Number two

Northern Water Snake

(Natrix s. sipedon)

The Northern Water Snake is one of the most common reptiles in Maryland. They have been recorded from every county in the state, and can be found without little difficulty. The water snake is likely to turn up in any pond, stream, or swamp. The water snake usually has a nasty disposition when first captured, and care should be taken in handling them for they can inflict a very painful, but harmless, bite. The majority of water snakes lose this aggressiveness after a few days in captivity, and assume a fairly docile disposition. Although they are fairly attractive snakes, most collectors do not keep water snakes in their collection as these snakes carry many parasites that can infect other snakes. But, this is no reason to ostracize these snakes. If these snakes are kept in a cage by themselves, there is no danger that they will infect the other specimens in your collection. Of course, this is assuming that mites are not a problem and that water bowls if washed together are cleaned with a good germicide.

Feeding Northern Water Snakes presents no problems. Water snakes will accept almost any type food, live or "prepared". A specimen that was in my collection for a seven-month-period accepted a wide variety of food. This snake fed regularly on almost anything I offered him, including: minnows, salamanders, frogs, strips of raw fish, and even strips of raw beef!

Housing a water snake is not difficult. The only two requirements that they have are that the cage be large enough to provide them ample room to move about, and that the cage be kept dry. Most people are under the false assumption that since water snakes are usually found near water, they should be kept in water in captivity. As a result of a damp environment, the snake often acquires many small sores known as water blisters. In reality, these snakes do not require any more water than any other snake in your collection. Also, water snakes do not have any special temperature requirement. They thrive well kept in a cage that is maintained at normal room temperature of 75°F.

David Saul, 1404 Haubert Street, Baltimore, Maryland, 21230

MARYLAND HERPETOLOGICAL SOCIETY



Bulletin of the MHS



Bulletin of the Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland

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Vol. 3 No. 4

31 December 1967

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Meetings: Third Saturday of each month, 9:45 a.m. at the Natural
History Society of Maryland. (Except May-Aug., field
trips are conducted, leaving the society at 8:00 a.m.)

The Cover: An albinistic Ambystoma jeffersonianum from Washington Co.,
Maryland. (see text) Photograph by Dr. Robert S. Simmons.

Vol. 3 No. 4 Bulletin Maryland Herpetological Society 31 Dec. 1967

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Ed. note: Manuscripts being submitted for publication should be typewritten (double spaced) on good quality 8½ by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by author. Reprints are available at \$.01 a page (\$.02 a page with photographs and should be ordered when manuscripts are sent in.

Kenneth T. Nemuras

Introduction: The Woodland Bog

It is a cool, sunny day, late in the morning perhaps, and the scent of skunk cabbage fills the clear, brisk air. The earth is soft and soggy from the long months of winter rain and melting snow, and seemingly everywhere, fresh, green blades of grass sprout up among the layer of brown decaying leaves. Small ponds, streams and trickles have adjunctly created a woodland bog, the natural abode of numerous small creatures- many but just recently emancipated from their almost lifeless state of hibernation. A Spotted Turtle reluctantly drops into the water from his position in the sun, or an occasional Box Turtle, still caked with a layer of winter mud, plods along the ground amidst a rustling of leaves. In the distance are heard American Toads, calling almost endlessly as they congregate for their annual mating activities.

Somewhere in the bog a small, dark-colored turtle emerges from a hole in the wet earth (Fig. 1) and catches its first glimpse of spring. It moves very little though, as the weather is still cool and the cold-blooded reptile has been inactive now for at least the past six months. The first sunny spot is as attractive as any, whether it be merely the entrance to the hole or a near-by clump of winter-browned sphagnum. Here the turtle withdraws its somewhat mud-smeared limbs and head into its equally stained shell- perhaps in an effort to avoid the sometimes breezy air, but still pick up the full strength of the sun's weak rays through the carapace- and remains until the oncoming chill of night drives it back into cover. This is the Bog Turtle- Clemmys muhlenbergi, scientifically-



Fig. 1.—A Bog turtle emerging from its winter retreat.

and by far the most unique member of this community niche. It was first described in 1801 by Schoepff (from specimens received from Heinrich Muhlenberg in 1778) under the name Testudo muhlenbergii, then placed in its present day genus in 1835 by Fitzinger (Barton, 1955). The Bog Turtle is quite properly regarded as one of our rarest reptilians...

The spring days grow longer and warmer, and the now agile Bog Turtle appears more frequently. Though the season may still present an occasional cold day causing the turtle to retreat temporarily, (unlike its associate the Spotted Turtle, which merely passes the time sunning in a somewhat numbed manner), the bog is alive with activity by the first part of May. Along the shallow edge of a swamp- like pond a couple of turtles have climbed up on the sides of grass tussocks in Spotted Turtle fashion, where they bask motionlessly in the early morning sunlight. The soggy grass not far away contains a vivacious individual engaged in a search for food. Quite perceivably, the turtle has taken on an atten-

uated appearance as a result of its body fats being slowly but inevitably consumed over the winter months. The gaunt turtle pushes its way through the damp grass, perhaps stopping occasionally to nip at bits of vegetation, while continuously being on the alert for any insects it should happen across. A small, clear trickle looks inviting, and in water scarcely deep enough to cover its limbs, the turtle slowly moves on, stirring up a cloud of sediment from the muddy bottom. An adult beetle that has fallen into the water, a slow-moving tadpole, or an occasional snail are quickly snatched up and crushed in the jaws of the alert and hungry turtle.

Insects are not particularly plentiful nor berries evident when the first Bog Turtles begin to roam in spring, so that their existence depends largely on what is readily available. Probably no other species is better adapted for such a situation, for the Bog Turtle has the capability of feeding both on land and under water. Yet, even when food is abundant, the metabolic rate of this highly energetic turtle makes it seemingly impossible for the reptile to increase its body girth. Indeed, the nimble Bog Turtle will never rival the Box Turtle, another occupant of the colony, which sometimes gorges itself to the point that complete withdrawal into its specially-hinged shell is virtually impossible.

In the deeper water of the bog the Snapping Turtle crawls leisurely along the bottom, every now and then bobbing to the surface for a look around, then sinking below in a half gliding, half swimming motion. Nearby, a Garter Snake slides through the leaves in search of a careless toad, while a couple of Black Rat Snakes crawl out of the woods and onto the shoulder of a road (running along side of the bog) where it is open and sunny. Across the road, Painted Turtles bask in a small canal, while Musk Turtles go almost completely undetected among the debris on the bottom. Several Painted Turtles have infiltrated the mucky water occupied by the Bog Turtle, and because of their mud-stained shells, somewhat resemble the latter from the distance. An occasional Spotted Turtle, with its shell browned and spots obliterated, even more so takes on the appearance of a sunning Bog Turtle. Quite the opposite is true in another small pond, however. As a Bog Turtle paddles near the surface with its head above water in Spotted Turtle or Painted Turtle fashion, it is suddenly disturbed, and dives below, coming to rest beneath a branch on the bottom. Though the Bog Turtle favors shallow water where it can roam freely, and is not often seen completely submerged, it can swim quite well.

Not too long after the daily life in the woodland bog falls into a routine pattern, the male turtles begin searching for their mates. Plodding through the soggy grass, a robust individual encounters a female basking in the sun, and immediately proceeds to mount her shell. The concave plastron of the male slides up over the curved carapace of the female, and in a snapping motion the male grabs for the neck of his mate. His limbs are stretched down along the sides of the female's carapace as he tries to grasp the edge with his proportionally longer nails. The female moves forward, and the male is carried along in piggy-back fashion until she stops. Then the longer tail of the male joins that of the female as the former slides back slightly, and copulation is con-

tinued. In June or July the female lays three to four eggs in a clump of damp moss, or perhaps in the moist earth beneath a layer of leaves. Eventually the young will hatch out as miniature replicas of their parents.

By the time the last female has carefully deposited her clutch of eggs, the woodland bog has changed considerably since the first days of spring. The small, clear trickles have slowly given way to stagnant puddles (or dried up completely); the ponds have dwindled and been taken over by a tangle of undergrowth; and the patches of low grass with sprouts of skunk cabbage have now been enveloped by an overspread of waist-high weeds. Box Turtles roam the bog in search of moisture, and may be encountered numerically over the Bog Turtle at the ratio of perhaps a dozen to one. An occasional nomadic Wood Turtle may also be found as it pushes through the weeds. The days get hotter, the bog drier, and the water lower. Soon, even the terrestrial Box Turtle must seek escape from the mid-day sun, and all that is seen of it is a shell half buried in the mud or a head protruding up from the shallow remnants of a pond. The dense undergrowth affords some protection for the Bog Turtle from would-be captors, but generally such protection is scarce. The turtle's season is now an ending one. Whether it be because of aestivation or an early hibernation, the Bog Turtle becomes an unseen member of the woodland bog.

Identification

Clemmys muhlenbergi belongs to a genus containing three other North American species, two of which are often found associated with it in the same habitat. (These are the Spotted Turtle, Clemmys guttata, and the Wood Turtle, Clemmys insculpta). The large, sculptured form of insculpta makes it easily distinguishable from muhlenbergi. Occasionally, specimens of guttata will have their carapace stained by mud, and have a few head spots other than the large yellowish-orange blotches, thus resembling muhlenbergi when seen from the distance. Such is especially true if the turtle is partly hidden or has only its head protruding above the mucky water. Generally, however, the yellow-spotted carapace of guttata makes it about the most recognizable turtle throughout its range. The other member of the Clemmys group (including a subspecies) occurs only along the western coast of North America, so will not present any identification problems in connection with the Bog Turtle habitat.

The most distinguishing characteristic of muhlenbergi is the large, reddish-orange blotch on each side of its head. The blotch may occasionally be broken into two separate blotches or sometimes include a number of small, disjunctive spots adjacent to it. Some specimens have blotches that are half-circles or almost crescent shaped (Fig. 2). A color difference is also apparent at times, with the normal reddish-orange blotches being of a yellowish hue. The main part of the head is dark brown, except for the chin and mouth area which may be streaked or spotted. The other appendages are also dark, and often mixed with red. The shell may be rough or smooth, streaked or unmarked. The coloration is dark brown or olive but the lighter scute markings vary considerably from those of a vivid pattern to ones nonexistent.

Grooved scutes are extremely prominent on some turtles, while on others these scutes are worn down, having an almost glossy surface. It is usually the older individuals that have a smoothly-worn shell, this no doubt occurring as a result of continual burrowing in the muddy soil. In extremely old specimens, the shell is sometimes worn beyond smoothness taking on a rather beat up appearance. The plastron is yellow and dark brown, varying from individual to individual. In some individuals it may be entirely brown. The maximum length that the Bog Turtle attains is $4\frac{1}{4}$ inches (based on data at hand). Further collecting may eventually yield a larger individual, but such would not likely be an average specimen. None have turned up among the countless number measured in the past by various authors. A male, 108mm (straight-line carapace length), was the largest given by Barton (1955). The lengths following are of Bog Turtles measured during 1965 and 1966. All specimens were recorded personally with the exception of three turtles (two received from Richard A. Hahn and one from Glenn Schwartz) and are arranged in order of size.



Fig. 2.—This photo shows the prominent neck spots of C. muhlenbergi.

<u>Length (straight-line)</u>	<u>Sex</u>	<u>Locality</u>
106mm (4.18 inches)	Male	Cecil County, Maryland
104mm (4.10 inches)	Male	York County, Pennsylvania
101mm (3.98 inches)	Male	Lancaster County, Pennsylvania
100mm (3.94 inches)	Male	Cecil County, Maryland
99mm (3.90 inches)	Male	York County, Pennsylvania
97mm (3.82 inches)	Male	Cecil County, Maryland
97mm (3.82 inches)	Male	York County, Pennsylvania
96mm (3.78 inches)	Male	Cecil County, Maryland
95mm (3.74 inches)	Female	Cecil County, Maryland
94mm (3.70 inches)	Male	Cecil County, Maryland
94mm (3.70 inches)	Male	Cecil County, Maryland
94mm (3.70 inches)	Female	Lancaster County, Pennsylvania
93mm (3.66 inches)	Male	Rockland County, New York
93mm (3.66 inches)	Male	Cecil County, Maryland
93mm (3.66 inches)	Female	Lancaster County, Pennsylvania
92mm (3.62 inches)	Female	Lebanon County, Pennsylvania
92mm (3.62 inches)	Female	Cecil County, Maryland
91mm (3.58 inches)	Male	Lebanon County, Pennsylvania
91mm (3.58 inches)	Female	Lancaster County, Pennsylvania
90mm (3.54 inches)	Male	Lebanon County, Pennsylvania
90mm (3.54 inches)	Female	Lancaster County, Pennsylvania
90mm (3.54 inches)	Female	Cecil County, Maryland
89mm (3.50 inches)	Female	Cecil County, Maryland
89mm (3.50 inches)	Female	Lancaster County, Pennsylvania
88mm (3.46 inches)	Female	Lebanon County, Pennsylvania
88mm (3.46 inches)	Female	Lebanon County, Pennsylvania

87mm (3.42 inches)	Female	Cecil County, Maryland
86mm (3.38 inches)	Female	Lancaster County, Pennsylvania
86mm (3.38 inches)	Female	York County, Pennsylvania
85mm (3.34 inches)	Female	Lancaster County, Pennsylvania
60mm (2.36 inches)	Female	Cecil County, Maryland

A sexual correlation (that males attain a larger size) might be derived from the list just given, as the 8 largest turtles were males and the 9 smallest were females. Barton reported on this subject: "Males seem to attain the greater maximum carapace length. Of 51 adults of known sex from all over the range, in museums or recorded in the literature, the seven largest are males with straight-line lengths of 108, 100, 96 (2), 95 (2), and 94mm. The largest of 29 females has a length of 94mm, and the mean of the series is 87.5; the mean length of the 22 males is 89.8mm."

Little mention has been made about the variation of Clemmys muhlenbergi throughout different parts of its range. It is probable that in any one colony specimens will differ from one another, while on the other hand, few areas have specimens with features entirely distinctive from those in other areas. Some differences were noted between the turtles from the woodland bog type habitat (Maryland) and those from the more open habitats further north (Pennsylvania) and are given here, but are based only on the turtles taken to date. These points are mainly that the Maryland individuals were generally broader in form (especially the females) than those from Pennsylvania, slightly darker in coloration, and with less conspicuous shell markings. Those with markings had only a few, usually extending outward from along the center of the carapace (where a thin line was sometimes present). Exceptions of course were taken from both areas. Specimens from Maryland have blotched carapace scutes and I took at least one individual in the field that was vividly marked, while some from Pennsylvania had few or no markings.

A Distributional Survey

There is little doubt that the range of Clemmys muhlenbergi is a scattered one, this evolving as a result of the turtle's need for specialized habitats. Equally obvious is the fact that many of the localities which yielded Bog Turtles in the past no longer have them today-and many of the areas that have them today will not harbor them in the future. This taken into consideration, the spotty occurrence of muhlenbergi (based largely on available literature) is presented in the following state-by-state account:

1. Delaware

From this state the Bog Turtle is listed by Barton and Price (1955) from Marshallton and Newark, New Castle County (see Fig. 3.).

2. Maryland

The Bog Turtle was unknown in Maryland until as late as 1941. On August 8 of that year Joseph Bures and Conrad Kenney uncovered an adult male, 96mm. in length, along Poplar Run in Baltimore County (1 mile north of Grave Run Mills and about 2 miles west and slightly south of Rockdale). McCauley, Jr., and Mansueti (1943) give the following account: "This is rich farming country and the surrounding area is hilly or rolling in character, very sparsely wooded, and without prominent rock formations. The turtle was found imbedded in hard yellowish to yellowish-brown clay beneath a board. The board was 15 or 20 feet from the stream which at this time of year had narrowed down to a foot or so in width leaving the surrounding banks muddy and soggy. The specimen lay right side up in a torpid condition with its head and limbs withdrawn. When removed, the carapace and entire body were found to be caked with mud and the turtle appeared lifeless. Several hours later it became active and then emitted an odorless liquid presumably from the bladder." The fact that no Bog Turtle had been found in Maryland prior to this led at least one of the collectors to assume that the mud-covered individual was probably a Painted Turtle when first seen and until actually examined (C. Kenney, pers. comm.).

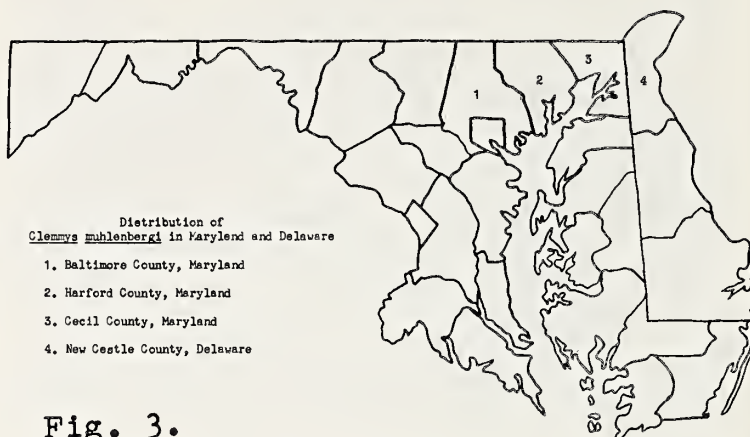


Fig. 3.

Other Baltimore County records include two specimens recorded by R. S. Simmons from a small roadside bog near Eko (Campbell, 1960), and a number of specimens from a stagnant swamp on the northeast bank of the Gunpowder Falls. Of the latter, Campbell gives the following description: "The swamp is approximately 130 yds. long by 10 to 20 yds. wide; it is bordered on the north by the quarry and is being slowly filled in by the quarries scrap-dumping activities. To the east it is bordered by the fill of a railroad spur and a hillside, to the west by the Gunpowder Falls, and to the south by a damp meadow through which a small stream drains the swamp. The first Bog Turtles were collected in the swamp on July 28, 1951. Between that date and May 23, 1953, 21 specimens were captured or observed. Only six specimens were actually removed from the swamp, two of these being empty shells. Nine of the remaining 15 turtles were marked by notching the marginals and released, but none was ever recaptured. The others were released without being marked."

Specimens are known in Harford County from Broad Creek and in Cecil County from Elk Neck. Another Cecil County location is a woodland bog at the Conowingo Dam, from which a number of observations were made during 1965 and 1966 (a chronological list appears in Vol. 2 No. 2 of the Bulletin of the Maryland Herpetological Society). During 1965 there were 15 specimens recorded from among the series of intermittent ponds, soggy grass areas, and small trickles making up the bog. The earliest was recorded on April 17. The 1965 specimen was a male, 94mm. in length and the 1966 specimen (found by Herbert S. Harris, Jr. and the author) was a male 93mm. in length. The first specimen was found at

2:48 p.m. and the second individual was found one year later at 2:50 p.m. The air temperature was in the 60's on both dates. Of the 15 turtles recorded here during 1965, 12 found by the author included only one with a deformity of any kind, this being that the nails and front part of one foot were missing. The other three were recorded by Michael J. Crotty and Tom Sparhawk; of those, one had a badly infected limb and died shortly after being found. The latest date that Bog Turtles were observed was June 5, when two specimens were seen. In August, when the bog was dry, the white shell remains of a Bog Turtle were found at the spot where the two individuals of June 5 were seen.

This particular woodland bog at one time probably supported the turtles in a larger area than at the present. All of the turtles just mentioned were located at one of two areas, approximately 3/4 of a mile to 1 mile apart. A narrow cleared strip with a couple of houses is evident about mid-way between the two locations, and below the Conowingo Dam proper, a considerable amount of land has been bulldozed over. The former situation though, was no doubt established some time ago. Fourteen Bog Turtles were released in sections of the colony by Michael Crotty and the author. The turtles were both unmarked and marked.

3. New Jersey

In a distributional survey, Robert R. Grant, Jr. (Philadelphia Herpetological Society Bulletin, Vol. 14, No. 2, 1966) lists the Bog Turtle from the Coastal Plain counties of Burlington, Gloucester, Monmouth, Ocean and Salem. Barton had earlier plotted the first four of these, and in addition, the (non-Coastal Plain) counties of Bergen, Mercer, Middlesex, Morris and Union.

4. New York

From Albany County, Bishop (1923) writes: "The first and only record of the species in Albany County was made May 28, 1923 with the capture of a mature male in Vly Creek swamp near Meadowdale, New York. Vly Creek has its origin in a series of cold springs near the base of the Helderberg Mountains and flows southeastward and then east for about two miles through a number of more or less connected larch swamps and meadows. Where the stream borders one of the larger wooded areas it is possible in time of low water to record the activities of the various animals living in and about the stream by the trails left in the mud. On several occasions the tracks of turtles have been observed leading from and to the entrance of muskrat burrows. The turtle mentioned above was found on the stream bottom a short distance from one of the burrows and the tracks indicated that it had used the burrow as a convenient retreat."



Fig. 4.

Shaded areas are the counties from which Clemmys muhlenbergi has been recorded in New Jersey.

Wright (1918) mentioned several localities: "In central New York we have formerly recorded this species as local both at Ithaca and near Geneva. At Ithaca we have found it in only one small meadow- an alder swamp with an undergrowth of *Caltha palustris*, etc.—but this area was originally sphagnaceous and now has a few remains of this floral association. This may account for the sporadic occurrence of these creatures here, and no doubt this is a vanishing colony...our botanical department has from time to time brought home specimens or records of this species from the Junius marl ponds (7 miles north of Geneva, and, in Wayne County). Here the species is taken in the narrow streams connecting the marl ponds or sometimes in the ponds and bogs. At Westbury, N.Y., (west of Oswego, N.Y.), Messrs. F. P. Metcalf, Ludlow Griscom and myself took a specimen (carapace about 6 cm. long) in an open moor-like area on August 13, 1916."

Fig. 5a.

Eastern New York

Clemmys muhlenbergi is recorded from Albany County (1) by Bishop (1923); from Dutchess County (2) by Stewart (1947); from Orange County (3) by Barton (1955); from Westchester County (4) by Barton; and from Rockland County (5).



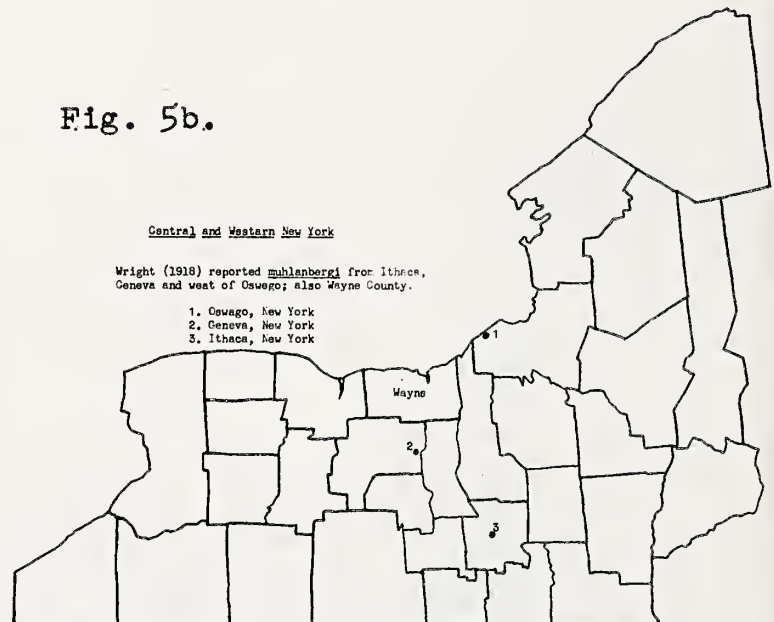
Stewart (1947) writes: "A rather large male Muhlenberg's turtle, *Clemmys muhlenbergii* (Schoepff), was caught at Camp Siwanoy, Wingdale, New York, July 7, 1946. This locality is close to the Connecticut border, which is only one-third of a mile away. Between the point of capture and the state line is a pond situated in a shallow valley. On the western bank of the pond the hill rises about 40 yards before it levels off. This level area is a field of grass and short weeds used by the camp. The turtle was found on this field crossing a path and heading west. The measurements (in mm.), in life, are as follows: Length of carapace 93mm, width of carapace 64mm, length of plastron 75mm, width of plastron at widest point 50." Barton lists the Wingdale locality in Dutchess County plus Queensboro in Orange County and Montrose and North Yonkers, Westchester County.

Fig. 5b.

Central and Western New York

Wright (1918) reported *muhlenbergi* from Ithaca, Geneva and west of Oswego; also Wayne County.

1. Oswego, New York
2. Geneva, New York
3. Ithaca, New York



5. North Carolina

Little has been written of the Bog Turtle's occurrence in North Carolina. Few specific localities are available and only a handful of counties. In general, the turtle is found in the south-

western corner of the state, the northwestern corner of the state, and a few scattered areas in between. A couple of reports have come to the author's attention (pers. comm.) but have been omitted here because of the absence of specimens, either live or preserved.

6. Pennsylvania

There is little doubt that Pennsylvania is the most populous state as far as the Bog Turtle is concerned, and most of the literature written on muhlenbergi has stemmed from here. In Pennsylvania the Bog Turtle is recorded by the Carnegie Museum (Robotham, 1963) and Barton and Price (1955) from the counties of Berks, Chester, Crawford, Delaware, Lancaster, Lebanon and Mercer. The former individually lists Bucks County; the latter individually lists Franklin, Montgomery and York Counties.

Burger (1933) reported a specimen from 3 miles north of Lebanon (Lebanon County), "...in a swampy situation at the foot of a little wooded hill." Barton described a situation in Lancaster County: "The swamp covers a little more than 2 acres and, geologically, lies near the edge of the Martic over-thrust in Wissahickon schist, of probable Pre-Cambrian age. The area is about equally divided by a small stream, a tributary to the south branch of Beaver Creek, running in a north-eastern direction. Seepage from a number of small springs gives rise to tiny runs which enter the stream from both sides. The section lying southeast of the stream is partially a wooded hillside sloping gently toward it. The lower segment of this area is covered with Sphagnum which has taken hold where the runs have fanned out into an anastomosis of rivulets while crossing the level area above the bed of the stream. Few trees are present here, although many moisture loving shrubs are well represented... The intersecting rivulets cut their ways through the blanket of moss, and provide the runways along which the bog turtle roams."

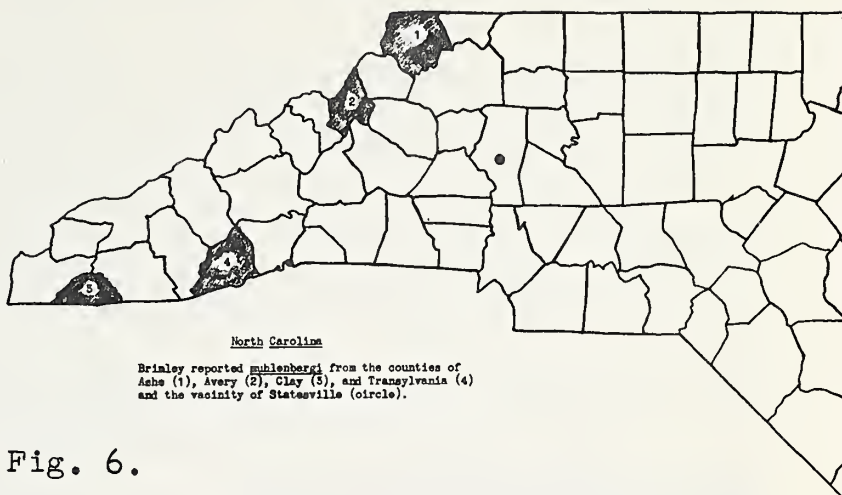


Fig. 6.

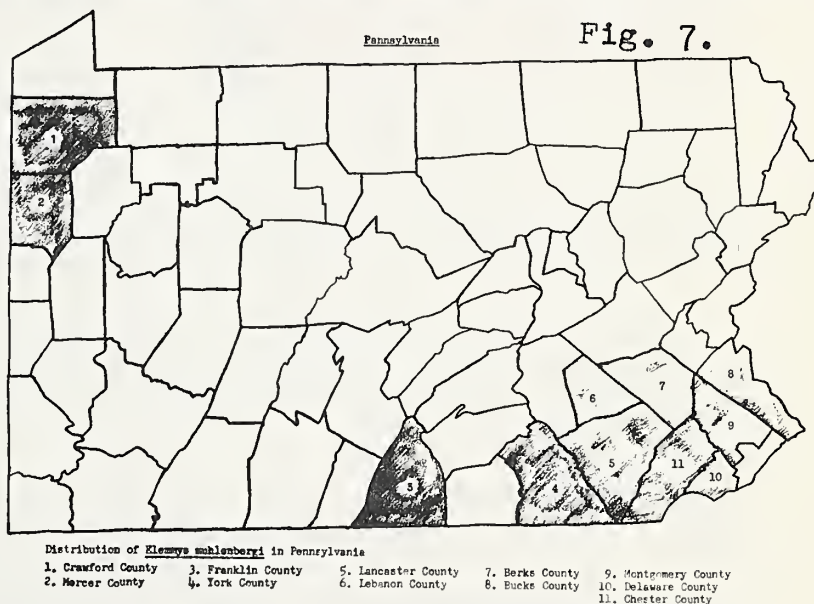


Fig. 7.

Habits

Food: Robotham (1963) observed one individual "...feeding on a long-dead water snake." Campbell (1960) reported: "On June 10, 1952, a small male (61mm) was collected while feeding on a dead Rana palustris under about

four inches of water. On another occasion, May 9, 1953, a specimen was observed eating the larvae of the Baltimore butterfly, Euphydras phaeton." Barton writes: "Our examination of the stomach contents of two adults taken in Lancaster County on June 13 revealed that they had been feeding primarily on insects, with one of the hairy lepidopterous larvae forming, in both, nearly one-half of the total intake. Coleopterous adults were the next commonest food item, followed by the fleshy seeds of a pondweed (Potamogeton). We are unable to explain the reason for the large number seeds of a sedge (Carex) contained in these turtles and in nine others subsequently examined, but these were too numerous and too uniformly present to be merely the result of accidental ingestion. Several larval cases of a caddisfly were found in both turtles. Also represented in both stomachs were the cocoons of a parasitic hymenopteran or dipteran probably ingested with their hosts. The upper intestine of one turtle contained the shells of several young snails (Succinea ovalis); that of the other had pieces of a millipede and a crane fly wing. The first of these also harbored three specimens of an oxyurid nematode, apparently related to the genus Aplectana (USNM Helm. Coll. 49324)."

Reproduction: Robotham writes: "I have observed mating in late May both in the wild and in captivity. The female in captivity in difficult. Mounting her shell, the aggressive male grasps her by the neck or head with his jaws, making her more tractable. Several pairs have been seen mating in the wild and traveling while copulating." Barton and Price: "The only date we find for mating observed in nature is June 4, 1950. Mr. Henry L. Collins, III, discovered a pair in copulation in a ditch near a small spring-fed brook at Berwyn, Chester County, Pennsylvania." Campbell: "Mating pairs of these turtles were observed on two occasions in the Baltimore County swamp, on May 30, 1952, and May 9, 1953. On both occasions the turtles were in water deep enough to cover the females completely and the males partially. In both instances the male had hooked his feet under the female's marginals and was observed to lean forward and make snapping motions at the female's withdrawn head."

An account of mating in captivity is given by Barton: "Mr. W. Stuart Cramer has kindly given us access to his unpublished notes on the courtship of this form. A captive pair was kept in an aquarium provided with a land area and a pool with a depth of more than twice the height of the turtles. Several days after capture, the male mounted the female under water, hooking the claws of his four feet under her marginals. He then thumped his plastron against her carapace several times, making a noise like two turtles shaken together in a bag. The female withdrew her head, and then the male moved forward without losing his footholds and, putting his head down in front of hers, blew bubbles of air and water through his nostrils. This procedure was repeated two or three times, and all the while he continued thumping lightly against her carapace. Next he moved back as far as was possible without losing the footholds and attempted to copulate. This entire performance was repeated several times at later dates, and each time both participants were entirely under water."

One pair kept in captivity by the author was placed in an empty aquarium temporarily while their permanent container was being cleaned. The male at this time mounted the shell of the female and began copulating. The female did not remain motionless and the male was thrown on its back (but did not break contact).

Wright (1918) mentions a female which "...had laid one egg in water, June 20, but this was broken. Forty days later, July 30, it laid another egg in sand while in captivity, and had one other in its oviduct to be laid. The laid egg was 30 mm. x 16 mm. in size while the oviducal one was 32 x 16 mm. The female had a carapace 9 cm. long x 6.4 cm. wide." Barton writes: "Reed and Wright (1909) mentioned deposition of a clutch by another captive on July 20. A female from Lancaster County, in our possession, laid eggs on July 30, (1), August 14 (1), and August 21 (1)."

On June 9, 1965, a clutch of four eggs was found in an aquarium, containing specimens the author had collected in Cecil County, Maryland. The eggs were placed in a jar with damp sphagnum, and covered. Two of the four eggs hatched on August 1 and the young muhlenbergi were 23 mm. and 25 mm. in straight-line carapace length. They were uniform brown with tan head blotches. The other two eggs did not hatch. Those which did hatch represented an incubation period of 53 days.

Robotham recorded a hatchling in the wild from Bear Mountain, New York, in 1955, and Wright reported one 34 x 29 mm. on July 18, 1908 from Wayne County, New York. Barton notes: "On September 7, 1929, one of us (Price) visited Gleisner's Swamp and there discovered a nest of Clemmys muhlenbergi." His field notes state, 'Saw four box turtles and fourteen Muhlenberg's turtles of various sizes. The day was very warm. Two spiral white objects (hatched turtle eggs) protruding from the moss led me to the nest, which was quite shallow and was four or five inches above the surface of the water in the swamp. It appeared that the female had buried herself in the moss and, after depositing the eggs, crawled out and allowed the moss to cover the eggs. Inside the nest was the third egg, with the young turtle just emerging from it.' Cramer, also, found a nest containing three eggs in Gleisner's Swamp on July 14, 1934."



Fig. 8—An egg of C. muhlenbergi.

Captivity: In captivity few turtles tame quicker, are more energetic, or show more intelligence than the Bog Turtle. Many specimens are timid when first picked up in the wild (usually withdrawing into their shells). Then, after being handled a short time, they may become somewhat aggressive (especially the males) and sometimes even hiss or snap, or just continuously squirm. Hardly a day or two in captivity passes however, and then they are quite tame. Many will feed readily their first day in a new environment. They have enormous appetites and will eat almost anything, either in water or on land. Several kept by the author fed readily on earthworms and tomatoes, never hesitating to fight over every scrap of food, no matter how much they would get. The turtles would follow their owner from one side of the terrarium to the other, always snapping at his fingers whenever teased. A layer of damp sphagnum moss was kept in their tank, with water not deep enough to allow the turtles to keep completely submerged. In this type of situation, the turtles were often seen nipping at the moss. Several bunches of ferns were planted in their tank on

one occasion, but the turtles immediately devoured them or tore them to shreds. Bog Turtles are not above snapping at other individuals kept in the same container (of the same species or otherwise) and can sometimes cause injury in the process. Such activity most often occurs at feeding time when the turtles wildly snap at any food in sight, including that in the mouth of another turtle. For all the food that they consume, the turtles never seem to put on any weight. An obese Bog Turtle is a rare sight indeed.

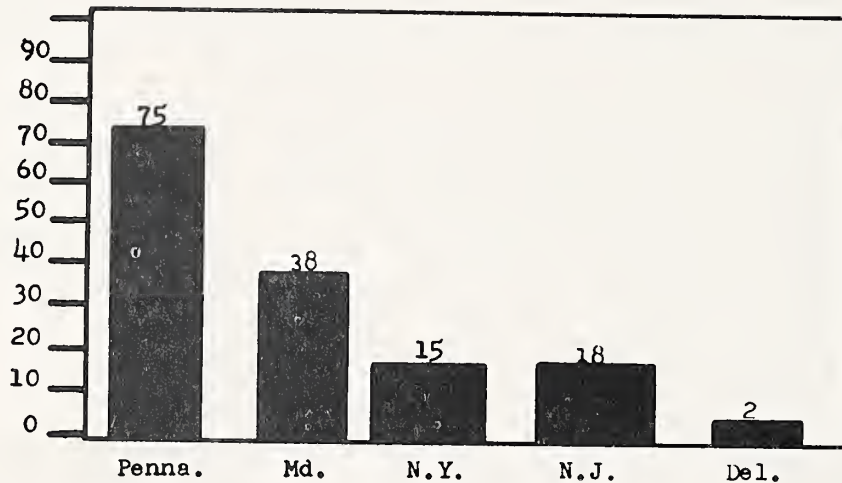


Fig. 9.

Literature examined: Of 148 specimens mentioned in 12 pieces of literature on muhlenbergi, nearly 51% yield from the state of Pennsylvania.

Fig. 10. Early Spring Sightings of <u>Clemmys muhlenbergi</u>		
Date	Locality	Source
April 4	Pennsylvania	Robotham (1963)
April 9, 1910	New York	Wright (1918)
April 10 (shell with flesh)	Baltimore Co., Maryland	Campbell (1960)
April 11	Baltimore Co., Maryland	Campbell (1960)
April 15	Trenton, New Jersey	Fowler (1907)
April 17, 1965	Cecil Co., Maryland	Nemuras
April 17, 1966	Cecil Co., Maryland	H. Harris, Jr. and Nemuras
April 24	Pennsylvania	Robotham (1963)

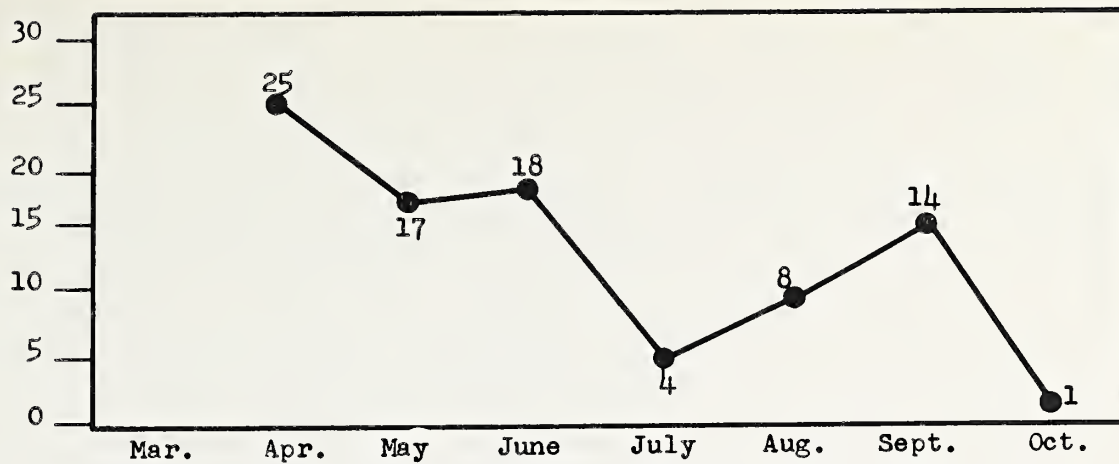


Fig. 11.

Monthly activity of muhlenbergi, based on dates given for 87 turtles from 11 pieces of literature. High September figure is from Barton (1955) and represents a single date.

Pennsylvania Pastures...

One warm September afternoon in 1965, Richard Hahn and I drove up to a roadside pasture in Lancaster County, Pennsylvania. We climbed out of the car, went down an embankment, and across the hoof-imprinted, weed-covered field. To the left was a fair size stream, to the right, a sloping hillside. Richard pointed out where small rivulets had cut their way through grass tussocks in the spring. Now they were dry. A small thicket was centered in the pasture and beyond that a spread of woods. Sunning among the weeds was a young Wood Turtle, though the agile Bog Turtle was not encountered. Apparently the dry state of the pasture had driven muhlenbergi into cover.

On April 21, 1966, I returned to the same area, this time finding a soggy, trickle-covered pasture. Among the tussocks just beyond the thicket I observed my first Bog Turtle there, and returning again on April 26 I encountered three more. In addition to the four live turtles seen, one shell was found in the thicket area.

In another Lancaster County colony, several miles from the one just mentioned, two other Bog Turtles were encountered on April 26. The colony, consisting of several soggy areas and patches of grass tussocks, is contained at the foot of a sloping, open hillside, and is largely wooded (except for one large tussock patch). A large stream flows around the rear of the colony, but is too deep and swift for muhlenbergi. One or two smaller streams and several rivulets constitute the turtles' runs. One individual was found sunning in a tussock patch (the open one), while



Fig. 12—A pasture in York County, Pennsylvania where C. muhlenbergi is found.

another was recorded 15 minutes later at a more soggy tussock situation along the edge of the trees. Both specimens were adult females. Near the second turtle an adult Spotted Turtle was also collected.

About a week later, on May 3, I observed four turtles at a colony in Pennsylvania's York County. It was located in a combination woods and thicket between two pasture areas (Fig. 2.). A small soggy-bordered stream flows into the trees from one of the adjoining pastures. Beyond the outer edge of trees and bushes, the latter of which is mostly briar, is an open patch of grass tussocks and a couple of small trickles. Here the stream joins another slightly larger one and flows along the edge of the tussock patch, often underground, with occasional breaks. Beyond the tussock patch the stream flows completely above ground and continues into the woods. At the far edge of the first grass tussock area is a briar thicket, almost impossible to penetrate. Beyond this there are at least two more patches of grass tussocks within the trees.

The four turtles observed here on May 3 were encountered between 3:00 p.m. and 3:30 p.m. while the air temperature was in the mid-sixties. All were found in the first open tussock patch. The first specimen, a male, was sunning on a grass tussock along one of the small trickles. Another male was recorded about five minutes later at the entrance to a hole near the water. A third male was picked up directly afterwards at the bottom of a grass tussock. The final specimen, a female, was encountered in a dry situation where the thicket began, at the edge of the tussock patch.

In Lebanon County, Pennsylvania, there is a colony located in a cleared strip of land between two wooded areas. I first learned of this situation from John Burnley, who made several observations here during the summer of 1965. My first field notes came in the spring of 1966, on the dates of April 21 and April 26.

The long cleared strip is the result of power lines being constructed through the area; and water no doubt originating from the wooded hill-sides forms two, adjoining, small soggy patches. A slightly higher, narrow mound separates the two marshy patches, and a stream flows from a small pond in one marsh, underground via the mound to the second marsh. Further away is a third soggy patch, connected by a stream flowing from the second marsh. No turtles were found in the third marshy patch on either of the two trips. From this patch the stream flows off into the woods.

Of five Bog Turtles observed here, three were found on the narrow mound separating the first two marshy areas, either at the entrance to, or down into holes. The first turtle was observed on April 21 at the entrance to a good-sized hole on the mound. When approached, the turtle dropped down into the hole and attempted to crawl back through the passage-way, where it was almost immediately out of reach. The bottom of the hole contained shallow muddy water, and a second inspection a while later revealed a bullfrog beginning to emerge from it. A Bog Turtle was also observed in each of the two marshes which the mound separated. The only other turtle found was a Spotted Turtle in the first marsh.

On April 26 I returned to the colony and noticed another Bog Turtle on the mound, this one down the entrance to another burrow, a yard or so from the previous hole. The bottom of this hole was dry, giving a dusty appearance to the Bog Turtle in it. As soon as I picked the first turtle out of the entrance, I noticed a second individual immediately behind it, adding a surprising climax to the situation.

The Bog Turtle and Man

The Bog Turtle today is facing an ever-increasing problem. The reduction of habitat is bringing about the inevitable elimination in some areas, of entire colonies. Ditmars reported collecting specimens on Staten Island (New York), for instance, yet now there are none. Robotham clearly presented the situation in Pennsylvania, which could easily be applied elsewhere: "Two examples of colony extinction occurred within 10 miles of each other recently, in Chester County (Penna.) in the West Chester-Downingtown area. The first was a small colony on the south side of Chester. The marsh extended about 100 yards, part in a wooded area, the rest in a field. The marsh, as usual, was formed by a small stream. It had many large, broken, cement drainage pipes lying convexly on the ground, which offered excellent retreats for the turtles. We found the majority of turtles in them, especially during the day in hot summer. It was cool under them, and moist. Otherwise, Bog Turtles estivate by burrowing in mud leaving their heads exposed. This colony had a varied fauna, including the ubiquitous Spotted Turtle. When we discovered this colony, only a few houses were present by the road. In 1960, the land was sold to a housing development company, which put a road through the center of the marsh. A trench was dug also, that drained some of the marsh. The rest dried up because of the way in which the road was built. I haven't found a Bog Turtle there since."

Robotham continued: "The second incident occurred in 1963 outside of Downingtown. This was a large colony on private land. A by-pass around Downingtown was built, straight through the colony, dividing it into two sections. The soil that was used to bank the highway was sold by the land owners. This created a 10-acre hole which the owners have decided to fill with water for a lake. If this is done, the marshes on one side will be drained and destroyed. The other side of the marsh is for sale and will probably be used commercially which in most cases causes the pollution of all water nearby."

At one time the ancient Bog Turtle may have roamed sphagnaceous bogs throughout a large portion of the eastern United States, being perhaps a very common sight. Time and changing conditions, however, have no doubt taken their toll of Bog Turtle populations. Even so, the present problem is not one caused by nature but rather, one developed by man. This includes not only roads cut through colonies, the plowing of bogs for farming use or the reclaiming of marshes for construction and industry, but of equal importance, the removal of large numbers of specimens from their colonies (or in simple language, "over collecting"). Too many turtles taken from a single colony can be just as damaging as if the whole bog was destroyed outright. A greater sense of responsibility on man's part would not only greatly improve the future of Clemmys muhlenbergi, but also benefit the entire area the turtle inhabits, including all other

forms of wildlife found there.

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THE CAUDATA OF LONG ISLAND

Check List of the Salamanders of Long Island:

1. Red-spotted Newt, Notophthalmus viridescens viridescens
2. Jefferson or Blue-spotted Salamander, Ambystoma jeffersonianum (Ambystoma laterale?)
3. Spotted Salamander, Ambystoma maculatum
4. Marbled Salamander, Ambystoma opacum
5. Eastern Tiger Salamander, Ambystoma tigrinum tigrinum
6. Four-toed Salamander, Hemidactylium scutatum
7. Red-backed Salamander, Plethodon cinereus cinereus
8. Northern Red Salamander, Pseudotriton ruber ruber (Exterminated?)
9. Northern Two-lined Salamander, Eurycea bislineata bislineata
10. Northern Dusky Salamander, Desmognathus fuscus fuscus (Exterminated?)

Account of the Salamanders of Long Island:

Notophthalmus viridescens viridescens - The first authority to mention the difference of reddish-brown Efts from Long Island when compared to the more brilliantly colored typical Eft found elsewhere was probably Pike (1886). Bishop (1941) states that in ponds located at the regions of Coram and Middle Island many newts complete their life cycle in the water. Burnley (1966) stated that the introduction of game fish in many of Long Island's ponds has undoubtedly reduced the newt populations.

Ambystoma jeffersonianum (Ambystoma laterale?) - Of course, all records prior to the recognition of Ambystoma laterale as a distinct species were reported as being Ambystoma jeffersonianum. Burnley (1966) lists only laterale as being found on Long Island. Mr. Roy Latham has informed me that he has found the species in question at Montauk, Sag Harbor, Greenport, Riverhead, Calverton, and Manorville, but has not noted any specimens since about 1950.

Ambystoma maculatum - Bishop (1941) states that maculatum have been found in ponds on Long Island associated with other amphibians that include Ambystoma tigrinum (= Ambystoma tigrinum tigrinum), Ambystoma opacum, Triturus v. viridescens (= Notophthalmus viridescens viridescens), Rana clamitans (= Rana clamitans melanota), Hyla versicolor (= Hyla versicolor versicolor), Hyla crucifer (= Hyla crucifer crucifer), Acris gryllus (= Acris crepitans crepitans), and Bufo fowleri (= Bufo woodhousei fowleri). Maculatum migrates to the breeding ponds in late March, usually following heavy rains, according to Burnley (1966).

Ambystoma opacum - Bishop (1941) states that in general the egg-laying season of opacum on Long Island may start as early as September 18th. The average length of eighteen larvae collected on 28 March 1928 in a pond at Coram had an average length of 33.7 mm. (Bishop, 1941). On 23 June 1928, full grown larvae that varied in length from 63 to 74 mm. were taken at Coram (Bishop, 1941). Bishop (1941) also reported that in the full grown larvae from Coram, he found that the stomachs were crowded with small white parasitic "worms".

Ambystoma tigrinum tigrinum - Engelhardt (1916) reported the finding of a tigrinum that measured $8\frac{1}{2}$ " during November 1911 at Syosset. Bishop (1941) reported that in a series of nine egg masses collected on 4 April 1926 at Syosset, the average number of eggs per mass was 38. The total length of twenty-one full grown larvae taken 22 June 1928 at Syosset varied from 90 to 123 mm. and averaged 106.7 mm. (Bishop, 1941).

Hemidactylium scutatum - Burnley (1966) stated that scutatum is found in boggy areas and is quite rare on Long Island. Scutatum formerly was found in the region of Jamaica, where it was recorded by Boyle (1914). Mr. Roy Latham has found this species in Easthampton and Southold Townships.

Plethodon cinereus cinereus - Burnley (1966) stated that this variety reaches great abundance in moist, heavily wooded areas. According to Burnley (1966), the Red-backed and Lead-backed phases of cinereus are usually not found in the same locality.

Pseudotriton ruber ruber - Ruber was formerly found on Long Island but is now, seemingly, extinct (Burnley, 1966).

Eurycea bislineata bislineata - Bislineata is found at streams in the region of the North Shore (Burnley, 1966). In Nassau County, I have recorded this species at Mill Neck. Burnley (1966) stated that bislineata larvae are sometimes seen swimming without regard for concealment.

Desmognathus fuscus fuscus - As is the case with Pseudotriton ruber ruber, Desmognathus fuscus fuscus was formerly found on Long Island but is, seemingly, extinct at the present time (Burnley, 1966).

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ACKNOWLEDGEMENT: I wish to express my appreciation for information given to me by Mr. Roy Latham.

—Frederick C. Schlauch, Post Office Box 103, Oceanside, Long Island, New York 11572.

Albinism in the Jefferson Salamander, Ambystoma
jeffersonianum Green

Few records of albinism in Ambystoma jeffersonianum Green have been reported. Neither Hensley (1959) or Brame (1962) in their lists of albinistic specimens, record Ambystoma jeffersonianum. The only mention of albinism in A. jeffersonianum known to the author is from an abstract of a paper presented at the fifth annual meeting of the Ohio Herpetological Society by McDuffie (1962).

An albino Ambystoma jeffersonianum larva (Fig. 1.) was collected by the author and L. Richard Franz on 15 May 1965 during the day, at a pond on Earnestville Road near U.S. Rt. 40, Washington County, Maryland.



Fig. 1—An albino A. jeffersonianum larva.

On the 23rd and 27th of May 1965, also during the day, the pond was revisited by the author and Robert S. Simmons. A total of 17 albino A. jeffersonianum larvae were collected and brought back to the laboratory. During the day time the albino specimens were clearly visible among the normally pigmented larvae.

These larval specimens were kept alive in captivity through metamorphosis (Fig. 2.). These specimens are presently catalogued under the accession numbers AS371HSH and AS405HSH in the authors private collection.



Fig. 2—An albino A. jeffersonianum compared to a normally pigmented individual.

On 19 May 1966 the pond was again visited, only this time at night. Metachrosis was very evident in the normally pigmented larvae, as it was almost impossible to tell them from the albinistic larvae. A total of

4 albino jeffersonianum larvae were collected by random dipping with nets.

In June of 1966, while checking various herpetological specimens at the University of Maryland, the author came across a series of small preserved jeffersonianum larvae, containing 3 albinistic specimens. These were collected at the same locality mentioned above, on 2 May 1964 by Richard Worthington.

All albinistic specimens of A. jeffersonianum taken at this pond have been larvae. Numerous trips have been made during the breeding season, but no adult albinistic specimens have been seen.

Since this pond is a temporary one, in May it becomes very shallow, just before drying up completely in early June. During the day the albinistic larvae "stand out", and they are perhaps the first larvae eaten by the numerous birds which were observed feeding there. Other Ambystomids in association with jeffersonianum in this pond are A. maculatum and A. opacum.

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-- Herbert S. Harris, Jr., Department of Herpetology, Natural History Society of Maryland, 2643 N. Charles Street. Baltimore, Maryland 21218.

The Snake Haldea valeriae pulchra in Maryland

In 1948 the writer reported Haldea valeriae Baird and Girard (NHSM-R1065) from Swallow Falls Park, Garrett Co., Md. (Md. Nat., 18: 51-52). This was the first record of Haldea from the Alleghany Plateau of Maryland. In 1954, Richmond (Ann. Carn. Mus., 33: 251-260) described Haldea valeriae pulchra from Pennsylvania, saying of the above Maryland specimen, "...it is presumably pulchra." The range he gave as "...apparently restricted to the unglaciated Alleghany High Plateaus and Alleghany Mountain section of the Appalachian Plateau Province from New York to West Virginia." Data recently acquired greatly augment those previously known for this subspecies in Maryland. All specimens mentioned are in the Natural History Society of Maryland (NHSM).

Range in Maryland. Apparently restricted to the Alleghany Plateau and recorded to date only from Swallow Falls Park and vicinity, Garrett Co. A specimen of Haldea (NHSM-R1640) from Big Pool, Washington Co. (on the eastern edge of the Alleghany Ridges of the Appalachian Province), the closest area to the Alleghany Plateau from which we have Haldea, is H. v. valeriae, as are all from the rest of the state, and shows no visible evidence of intergradation.

Description in life of a Maryland specimen. (Fig. 1). A gravid female (NHSM-R1678) taken August 3, 1957, at "moss fields," Swallow Falls Park, shed its skin the day after capture. Appearance glossy; scales keeled dorsally, keels fainter laterally and disappearing on the first and possibly second scale rows; color russet-tan, suffused with pinkish-orange towards ventrals; russet-orange mid-dorsal stripe from back of parietals to end of tail; dorsal stripe bordered with black flecking; lateral black spots spaced, but arranged almost linearly at level of 4th row; occasional black spots elsewhere; supralabials pale, dusky, not as light as infralabials and chin; head and neck flecked with black; approximate center third of venter yellow, grading on sides into pinkish-orange, becoming white at 9th scute; chin white, flecked sparsely with gray; top and rear of eye with continuous russet half-moon; scale rows 16 (just behind head)-15-17-17; supra- and infralabials 6-6; postoculars 2R-3L; ventrals 121; caudals 32.

Size and sexual dimorphism. Largest adult female, 275 mm. total length; smallest, 10 day old female, 110 mm. total. Data for 3 males and 3 females, respectively: ventrals 121, 120, 116, 122, 121, 123; caudals 43, 41, 42, 35, 32, 31; ventrals minus caudals 78, 79, 74, 87, 89, 92; total length 115, 119, 113, 110, 275, 230; tail length 23, 21, 22, 17, 44, 35; percent tail of total length 20.0, 17.6, 19.5, 15.5, 16.0, 15.2.

Reprinted from Herpetologica, 14(1):121-122, 1959, with the authors permission.

Breeding. The four shortest specimens listed above were born Aug. 25, 1957, to the largest female listed, taken Aug. 3. Richmond (Op. cit.:256) found only 2 males in each of four litters, numbering 5, 5, 7 and 8 young. The above litter contained 3 males, 1 female. The level of umbilical attachment varied between ventrals 13-18. Within 2 to 3 days after birth the young shed their natal skin.

Habitat and associations. Swallow Falls Park and its environs are at about 2500 feet elevation and are characterized by mixed deciduous and hemlock. Most of the specimens were taken under rocks (except one DOR) in timbered areas with dense undergrowth of ferns and bryophytes, or in a bog where ferns, sphagnum, and other mosses predominated.

Remarks. Haldea v. pulchra in Maryland averages a higher number of caudals in both sexes than H. v. valeriae; the number apparently varies by as much as 10 to 12 scales.

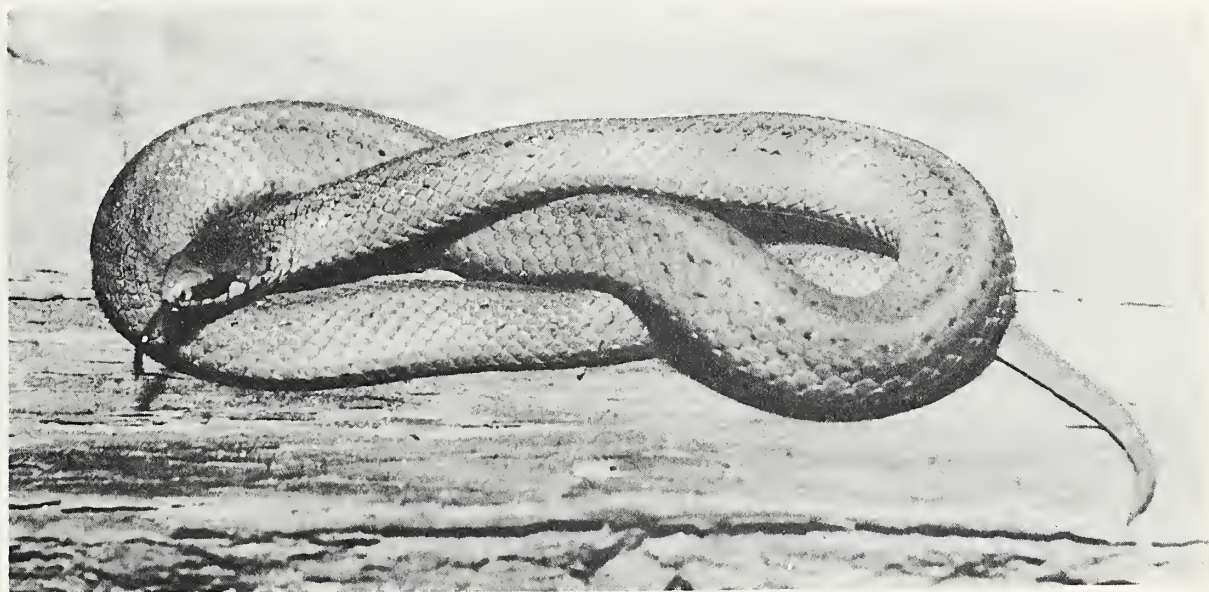


Fig. 1. Adult female Haldea valeriae pulchra Richmond (NHSM-R1680) from near Swallow Falls Park, Garrett County, Maryland; photo by Dr. Robert S. Simmons.

The specimen of Haldea from "moss fields" mentioned by Lemay and Marsiglia (1952, Copeia, 3: 193) cannot be located. It is undoubtedly pulchra. A male pulchra (NHSM-R1641) catalogued as from "Pennsylvania" has no other collection data; scales 15-17-17; supra- and infralabials 6-6; 233 mm. total, 47 tail (20% of total length); 116 ventrals, 45 caudals, ventrals-minus-caudals 71; dark dorsally, dark color encroaching onto edge of ventrals, contrasting with light venter. This is, according to Richmond (Op. cit.: 253),

characteristic of specimens from the northern Pennsylvania counties.—John E. Cooper, Dept. Herpetology, Nat. Hist. Soc. Maryland, and Baltimore City College, Baltimore, Maryland.

Ed note: The above note is up to date, as nothing concerning H. v. pulchra in Maryland has been published since.

A Red-bellied Turtle, Pseudemys rubriventris, from Kent County, Maryland

Prior to 5 March 1967, Pseudemys rubriventris had been known from only thirteen of Maryland's twenty-four counties.

On 5 March 1967, Richard Franz and the author were attempting to locate new Ambystoma t. tigrinum ponds in the Kent and Queen Annes County areas.

In Kent county on Md. Rt. 291, 0.7 mile from Millington we stopped to investigate what appeared to be a possible tigrinum pond. It was later discovered that the water is back up from the Chester River and is backish. Deciding this was not an area for tigrinum, we started to leave. The author noticed something floating on the surface of the water; to his surprise it was a turtle. The weather was quite cold, high that day being only 44°F.

Initially, identification was impossible, the specimen being covered with algae and mud. Its eyes were closed and it appeared to be dead. After removing the mud from the turtle we noticed an arrow head like marking on the snout. This was the identifying mark of a juvenile rubriventris.

The specimen was taken to Herbert S. Harris Jr, and identification was verified. The specimen measured 53 mm. in length. The carapace is slightly keeled and is patterned. The plastron is marked with drab grayish-black blotches on a yellow background. The specimen is catalogued number RT73HSH in the private collection of Herbert S. Harris Jr.

This turtle represents a new county record for Kent County and brings the number of counties in which it is found to fourteen. —David Kramer, Natural History Society of Maryland, 2643 N. Charles St., Baltimore, Maryland 21218.

Ed. note: It was the policy to publish in the last issue of each year an Additions to the Distributional Survey: Maryland and the District of Columbia with a list of all the new county records received for the year. Since the only new county record received was the one mentioned above (P. rubriventris) it will be held over until more are received.

Story Board - An Aid to Motion Picture Continuity

Continuity can be called the smooth and logical flow of visual shapes and images - without it any motion picture is doomed to failure or at best to be classed as a "home movie".

After the script has been written the next step is to visually plan the scenes that will make up the film. Naturalists filming specimens should have a good idea of how the final product will look or much time and film will be wasted. It is very confusing to look at specimens pointing to the viewer's right and then have the next scene with the same specimens pointing to the left. This visual problem is compounded when many different specimens must be shown during a short period of time. This problem of continuity has long been recognized by professional motion picture producers and is one of the hidden extras which the viewing public accepts and looks forward to but is not immediately conscious of.

One method of assuring good continuity or proper flow of the scenes in a motion picture is by the use of story board. It is nothing more than paper that has printed on it a rectangular form with approximately the same shape (aspect ratio) as the film intended for use. Story board may be purchased from any good art supply or photo store that cater to semi-professional or professional people. However, since story board can be comparatively expensive and perhaps hard to obtain the author suggests that the reader make his own. All that need be done is this:

1. Determine the vertical and horizontal dimensions of the film frame.
2. Triple or quadruple these dimensions onto a piece of stiff cardboard.
3. Cut out the cardboard frame and trace its shape several times on paper - leaving space for notes. (If the reader is fortunate enough to have some type of reproduction process available, a stencil may be prepared and many copies run off at once. A sample of this is found on the following page).

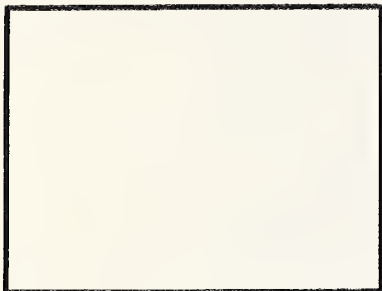
With story board the visual relationship between every scene may be planned for in advance. The naturalist photographer can "see" the entire film before a single frame is exposed. All scenes of a particular type (location, studio, close-ups, etc.) can be done at one time - no matter what their sequence in the film. The author realizes that changes are often necessary in film making. When changes are made, the story board will enable them to be visual as well as mental, thus enabling the producer or cameraman to handle them in such a way so that they will not disrupt the continuity or flow of the film.

Story board can be a valuable asset to the movie maker. Its use should be seriously considered whenever a serious motion picture is planned. The story board method was used by the author and his associate, James G. Kimos, in the production of the film The Poisonous Reptiles of Maryland.

—Daniel J. Lyons, Dept. Photography, Natural History Society of Maryland, 2643 N. Charles St., Baltimore, Maryland 21218.



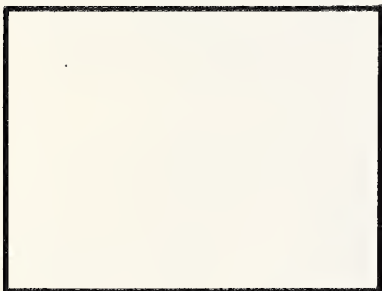
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A New Subspecies of Elaphe from California

By John D. Groves

During the course of examining specimens for my monograph of the rat snakes, genus Elaphe, three specimens of Elaphe subocularis were obtained from John A. Moore of Hollywood, California. The locality of the above specimens was given as Paramount Studios, Stage 6. The collector, John Wayne, collected two of these on April 1, 1961, and the third on May 6, 1961. In these three specimens a marked diversity in certain features of color pattern, scalation, and general appearance of the head has been noted. These differences are so outstanding as to warrant subspecific recognition, for which I propose the name:

Elaphe subocularis waynei,
in honor of the collector, John Wayne, and his horse.

Diagnosis: A large snake closely related to Elaphe subocularis, but differing in having no subocular scales (instead of 2); a larger number of scale rows (36-73 instead of 31-35); and in having larger sums of ventrals and caudals.

Description: Dorsal ground color is envy green; throat and underside of neck are pure white; the rest of the ventral surface is dirty white. The underside of the tail is somewhat messy; the anus is square. A series of 30 to 38 horse-shoe shaped saddles, which are embarrassing red, is found on the sides. The head plates are black and blue, with a "Ten Gallon" hat pattern on the top of the head, a little off-center.

Variations: After discovery of this new subspecies, a careful study of all available museum material of western rat snakes was started. Three recently described rat snakes were located and examined. All three were identical to the form under discussion, with but few exceptions. It is my belief that all three are valid waynei specimens. The first of these, the Bearded Rat Snake, (Elaphe s. harrisi) named in honor of Herbert S. Harris's beard, has a very dark coloration on the chin, but otherwise is identical to waynei. The second was described by Daniel J. Lyons, known as the Greedy Rat Snake (Elaphe s. greedy). This differs only in having the facial appearance of a money-hungry individual. A third snake was described by John E. Cooper on the basis of a single Arizona specimen. This snake has the ventrals of the stomach enlarged, and also has a subocular scale behind the eye on top of the head. This, which Cooper (or Cooper or what ever it is) called the Western Big-bellied Rat Snake (Elaphe s. foodii), is typically, in all other manners, a waynei.

Range: What's-his name's place, Nevada, south to Joe's Bar, eastward to Dry Gulch Arizona, and westward to Peyton Place.

Habitat: (see Authorities below) This form seeks lower ground than subocularis. It is typically found in heavily populated areas at elevations of 0 to 900 feet.

Authorities:

1959, H. S. Harris, Jr.: "I collected several Elaphes in Joe's Bar that had the appearance of my beard. This is due to a heavy black coloration on the first three labials, and to my present condition."

1960, D. J. Lyons: "Upon the end of the rainbow in search of the pot of gold, a large handsome Elaphe was collected coiled on the pot guarding the gold. My first thought was to get the gold, then collect the lousy snake to further knowledge in the field of herpetology. I thought it might be a new subspecies or species of snake because of the silly grin on its face. It had the look of a Society Treasurer taking money for society dues."

1962, J. E. Cooper: "A single specimen collected near Dry Gulch Arizona, having a large series of enlarged ventrals in the region of the stomach were present. A third eye was also present behind the ocular scale on top of the head, which is not generally known for this snake. Maybe it was the weather that caused this!"

It is my belief that the form under discussion should be recognized as a new subspecies of the Rat snake. I feel that the names listed above are not valid, because of the fact that I don't like the collectors.

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BULLETIN OF THE

Maryland Herpetological Society



MARCH 1968

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The Cover

An adult *Aneides aeneus* collected 4 September 1966 at "House Rocks," Garrett County, Maryland. USNM 160939. Photo by R. S. Simmons

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THE GREEN SALAMANDER *ANEIDES AENEUS* (COPE AND PACKARD) IN MARYLAND

Herbert S. Harris, Jr. and Daniel J. Lyons

Although the Green Salamander, *Aneides aeneus*, had been collected near Maryland in the neighboring states of West Virginia and Pennsylvania, it had never been recorded in Maryland (Cooper, 1965:153; Gordon, 1952). On 4 September 1966 the first adult *Aneides aeneus* was collected by the authors at "House Rocks," Garrett County, Maryland, at an elevation estimated at 2,625 feet. The area is approximately 1.3 miles southwest of the Youghiogheny River Bridge on the Sang Run-Cranesville Road. "House Rocks" is an outcropping of Pottsville sandstone with many crevices (Fig. 1.). It is located on the Sang Run Quadrangle (7 1/2 minute series, Maryland - West Virginia Topographic Map, U. S. Geological Survey), at 39° 33' 43" North Latitude and 79° 26' 53" West Longitude. The salamander was collected as it moved along the edge of a large crevice.

The specimen (Fig. 2.), measures 122mm total length, 61mm snout-vent length. Dorsally, the coloration is black with greenish lichen-like blotches; on the sides there are numerous yellowish flecks. Ventrally, it is a pale gray. The green lichen-like blotches are ill defined on the dorsal surfaces of the legs, and on the posterior portion of the tail. There are 15 costal grooves, counting 1 in the axilla and 2 which run together in the groin. The specimen is catalogued 160939 in the United States National Museum.

It had rained for several hours that morning. Total precipitation for the day was recorded from two nearby areas. Oakland to the south south-east had 0.15 inches and Bittering to the west north-west had 0.44 inches. The sky was overcast and temperatures ranged from a high of 23.3°C to a low of 16.7°C.

This area was visited on 10 September 1966 by Harris and L. Richard Franz. Two Green Salamanders were observed, but they retreated deeply into a crevice before a wire could be readied. The sky was hazy, and the temperature was between 21 and 24°C. It had not rained since the previous weekend.

The predominant plants in the area are the Quaking Aspen (*Populus tremuloides*), Chestnut Oak (*Quercus montana*), Red Oak (*Quercus rubra*), Red Maple (*Acer rubrum*), Striped Maple (*Acer pensylvanicum*), Black Locust (*Robinia pseudo-acacia*), White Sassafras (*Sassafras albidum*), and Bracken Fern (*Pteridium aquilinum*). The timber in this area is largely second growth.

Directly associated with the Pottsville sandstone outcropping are Great Laurel (*Rhododendron maximum*), Common Polypody Fern (*Polypodium virginianum*), and unidentified mosses and lichens. Animals associated with the Pottsville sandstone in this area, which were seen and collected, include Camel Crickets (*Ceuthophilus* sp.), Slimy Salamanders (*Plethodon g. glutinosus*), and unidentified millipedes, spiders and harvestmen. In the immediate area the following amphibians and reptiles have been collected: *Plethodon c. cinereus*, *Pseudotriton r. ruber*, *Crotalus h. horridus*, *Diadophis p. edwardsi*, and *Lampropeltis d. triangulum*.

In the northern part of its range, *Aneides aeneus* is usually associated with Pottsville sandstone. It has been collected in the Pottsville sandstone of Cooper's Rock State Forest, Monongalia County, West Virginia. Carnegie Museum specimens from Preston County, West Virginia, include those taken 2 miles south of Lenox,

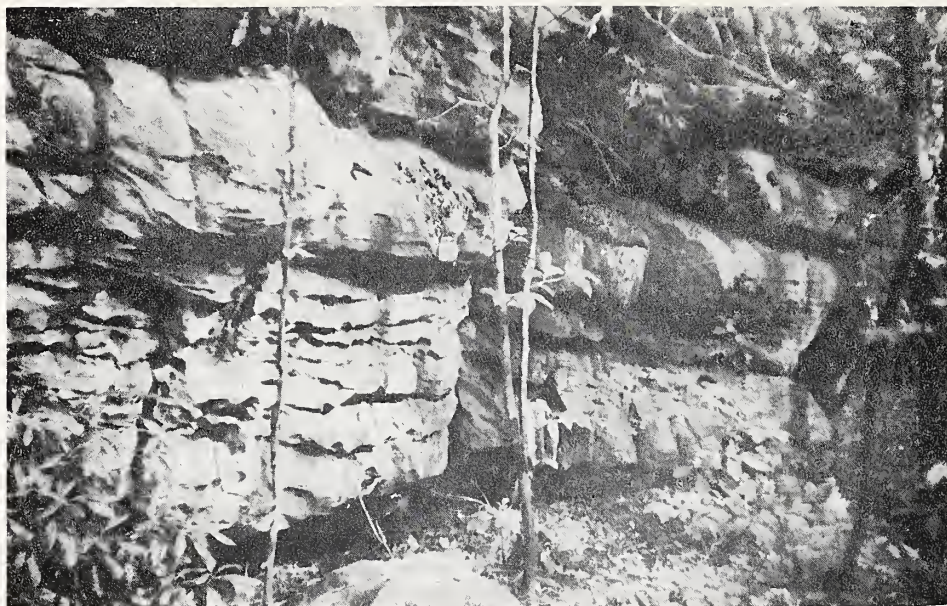


Fig. 1--(A,B) A section of "House Rocks," Garrett County, Maryland. Pottsville Formations such as these are the typical habitat of *Aneides aeneus*.





Fig. 2--The *Aneides aeneus* (USNM 160939) collected 4 September 1966 at "House Rocks," Garrett County, Maryland.

CM 34421, and 1 mile north of Rockville, CM 24414-16 (Richmond, 1966). In Fayette County, Pennsylvania, Mr. Richmond informed me of a specimen collected 5 miles south-east of Smithfield at Wyp Gap (CM 29749-53). These areas are within 20 miles of Garrett County, Maryland. Pottsville formations are distributed throughout Garrett County. After an outcropping was located, it was not surprising to find *Aneides aeneus*.

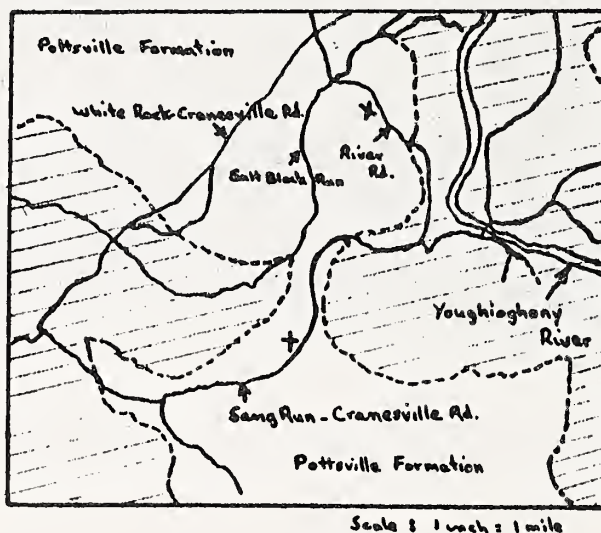
Earlier on 4 September 1966 the authors visited Rock City, which is in the Cooper's Rock State Forest, Monongalia County, West Virginia, to see the Green Salamander in its natural habitat. In this Pottsville sandstone area, we found the Green Salamander to be abundant. The elevation is 2,239 feet. It had been raining heavily for several hours, and the temperature was about 23°C. We collected a dozen specimens which are preserved in the author's collection (AS408HSH-AS419HSH). These measured from 71mm to 121mm total length and from 36mm to 63mm snout-vent length. Averages were 107mm total length, 51mm snout-vent length. The coloration and morphology largely agree with the description given by Bishop (1947:328) and with the Maryland individual. Plant and animal associations here seemed identical to these of the Maryland area.

Additional Notes

Numerous trips to western Garrett County have been made since the Green Salamander was first found in Maryland. "House Rocks" was visited many times and although several additional specimens of *Aneides aeneus* were observed, none were collected. These specimens were located far back in the sandstone crevices.

Pottsville outcroppings in other areas of Garrett County have been located and marked on topographic maps. Several of these new areas have been checked one or more times. Thus far, only one of these has been productive. On 11 June 1967, two additional Maryland *Aneides* were collected from an area 1.3 miles NNW of the Sang Run-Cranesville Road, on River Road, by the authors and Dr. Charles J. Stine. This Pottsville sandstone outcropping (Fig. 3.) is located on the Sang Run Quadrangle at approximately $39^{\circ} 34' 37''$ North Latitude and $79^{\circ} 26' 30''$ West Longitude. The area was visited on 1 July 1967 by the authors and Dr. Robert S. Simmons; and four adult *Aneides* were collected.

Fig. 3--Map shows the location of the two localities in which *Aneides aeneus* has been collected in Garrett County, Maryland. An X represents each locale.



The area is in the general region of "House Rocks." The major difference is the moistness of the new area. These formations have an abundance of mosses covering their surfaces. There is also a spring at the site. This area was first visited in November of 1966, at which time no *Aneides* were observed. Apparently the cold temperatures forced the salamanders further into the crevices. The two specimens collected on 11 June 1967 had stub tails. One of these specimens was devoured by a large *Pseudotriton ruber ruber* while in the collecting vessel. The other, AS447HSH, has a snout-vent length of 49mm. Of the four specimens collected 1 July 1967, only one (AS448HSH) has a stub tail. The snout-vent length of this specimen is 42mm. Total and snout-vent lengths (in mm) for two of the remaining specimens are 101, 59 and 108, 57 respectively (AS449HSH, AS450HSH). AS449HSH has a regenerate tail and appears to be an old adult specimen. These *Aneides aeneus* will be deposited at the United States National Museum in Washington, D. C., and at the Carnegie Museum in Pittsburgh, Pa.

Animals directly associated with the Pottsville sandstone here include Camel Crickets (*Ceuthophilus* sp.), Dusky Salamanders (*Desmognathus* sp.), and unidentified millipedes, spiders, and harvestmen. Also noticed were numerous mosquitoes, apparently breeding in the pools of water resulting from the seepage through the sandstone. No specimens of *Plethodon glutinosus glutinosus* were seen at this locale.



Fig. 4--The second locality in Maryland in which *Aneides aeneus* has been collected, 1.3 miles NNW of the Sang Run-Cranesville Road on River Road, Garrett County, Maryland. A-The Pottsville Formation. B-Close-up of the actual crevices.



The authors would like to express their appreciation to the following persons who encouraged them in their search for *Aneides aeneus* in Maryland; Mr. John E. Cooper, Mr. L. Richard Franz, Mr. Frank Groves, Dr. Robert S. Simmons, and Dr. Charles J. Stine. They would also like to thank Mr. L. Richard Franz for identifying the plants of the area.

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Ed. Note: Since the preparation of this note the additional Maryland specimens have been deposited at the United States National Museum and the Carnegie Museum. Catalogue numbers are as follows: AS447HSH=CM 45848; AS448HSH=CM 45849; AS449HSH=USNM 163378; AS450HSH=USNM 163379.

Long Island Turtles of the Family *Chelydridae*

Three turtles of the family *Chelydridae* are indigenous to Long Island, New York. These three chelonians are *Chelydra serpentina serpentina*, *Sternotherus odoratus*, and *Kinosternon subrubrum subrubrum*.

Account of Species:

Chelydra serpentina serpentina - The Common Snapping Turtle was reported by Murphy (1916) as being generally distributed and locally common. The author captured several snappers at the locality of Wantagh. A small *serpentina* was caught by the author on 30 July 1965 in the region of Hempstead. On 3 August 1965, the author found two Common Snapping Turtles in the region of the Tanglewood Preserve, Lynbrook. Specimens and eggs of this subspecies were reported to have been seen by W. T. Davis in the vicinity of Tobacco Lot Pond, on Gardiners Island (Murphy, 1916). Murphy (1916) reported that at Mastic, he frequently found deposits of eggs which had apparently been dug up by foxes or raccoons. According to Murphy (1916), snapping turtles were referred to by the name "Torup" along the south shore.

Sternotherus odoratus - The shells of four Stinkpots were reported to have been found by W. T. Davis on 8 August 1912 near the water's edge of Long Pond, Wading River (Murphy, 1916). The author has found Stinkpots in the Peconic River at Calverton.

Kinosternon subrubrum subrubrum - Murphy (1916) stated that G. P. Engelhardt found *subrubrum* in Queens County at Casino Lake, Flushing, and in Kings County at Prospect Park. An eastern Mud Turtle was found by F. Overton in the salt marshes at East Patchogue on 9 September 1913 (Murphy, 1916). Nichols (1914) reported finding a mud turtle in the claws of a crab at Mastic.--Frederick C. Schlauch, Post Office Box 103, Oceanside, Long Island, New York 11572.

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1914. Mud turtle attacked by crab. *Copeia*, (12).

NOTES ON THE HERPETOLOGY OF PANAMA: Part 5

Ken Nemuras

The Genus *Leptodactylus*

Four members of this genus are known from the Canal Zone in central Panama, *L. labialis*, *L. insularum* (also called *L. bolivianus*), *L. quadrivittatus*, and *L. pentadactylus*, the "Smoky Jungle Frog." A key to the identification of these frogs will follow the discussion.



Fig. 1--*Leptodactylus insularum* from the western Canal Zone.

During 1966 I frequently found *L. labialis* (the smallest of the four) in the grass on the golf course at Fort Kobbe, Canal Zone and in the grassy areas on Howard Air Force Base. They often occur in small drainage ditches. The species is found more consistently at night, but is not uncommon during the day in the damp grass after a rain, or along small wooded streams. I sometimes found the larger *L. insularum* (Fig. 1) with *labialis*, though they appeared more often among the ponds at Cocoli, Canal Zone. At the latter location I encountered them during the night while hunting treefrogs. They also turned up during the day in weeds along the edges of ponds, and sometimes in near-by small ditches. The adult male of this species has very heavy forearms, distinguishing it from the female. *L. pentadactylus* is the largest *Leptodactylus*, and also the loudest. I encountered two large individuals after a rain during the night of 10 June 1966 at Fort Kobbe, Canal Zone. The first was found hopping across a dirt road through the jungle and was caught when it took refuge in a rain puddle in the road. A short while later another specimen was seen along a stream not far from a jungle pool, but was not captured. Young frogs are periodically encountered along wooded streams during the day, though the adults are mostly nocturnal.

The eyes have a shine, usually reddish orange, which is particularly noticeable at night when seen in a flashlight beam.

Dunn (1931) commented on *Leptodactylus* at Barro Colorado Island, Canal Zone: "...*pentadactylus* rather rare with three records at the time. One was in a burrow and K. P. Schmidt and his colleagues of the Crane expedition spent nearly a day in vain trying to excavate it from what proved to be quite an extensive underground habitation; *insularum* or *bolivianus* (which is common on the Pacific-side) taken once on the night of July 22; *labialis* has been taken near-by at Fort Sherman and at Majagual."

Leptodactylus melanonotus occurs outside the Canal Zone and is identified by the presence of black spines on the undersides of the fingers. At El Valle de Anton, Panama, Dunn (1933) reported: "...*L. labialis* and *L. melanonotus* numerous in valley. *L. pentadactylus* occurred in the valley, but was much more common in the woods, where we saw perfectly gigantic specimens. The notes...have a family resemblance, all seeming to begin with a 'wh' sound. *L. melanonotus* has much the lowest and softest note, *labialis*...the highest, [which is] more of a whistle. *L. bolivianus* has a loud edition of *melanonotus*, while *pentadactylus* has a very loud deep 'whoop'."

Key to Canal Zone *Leptodactylus*

- A. Small species; short head; short vomerine teeth; heel to eye; dorso-lateral fold; toes not fringed.....*labialis*.
- AA. Very large; short broad head; medium vomerine teeth; heel to tympanum; a dorso-lateral fold; toes not fringed.....*pentadactylus*.
- AAA. Medium sized; long head; long vomerine teeth; heel to eye or to snout; three dorso-lateral folds on a side; not striped; toes fringed.....*bolivianus* or *insularum*
- AAAA. Medium sized; long head; long vomerine teeth; heel to snout; two dorsal folds in middle of back; striped; toes not fringed.....*quadrivittatus*

The Genus *Eleutherodactylus*

Although a number of these usually small forest frogs abound in Panama, I recorded only one species during 1966 and early 1967, *E. fitzingeri*. During the night the frogs often appear to be colorless, but when placed in the sun or encountered during the day, they are brownish. Some individuals have a reddish-orange stripe down the center of the back, but all *fitzingeri* are recognized by the white line down the center of the chin, usually against a cloudy-white background.

Key to Canal Zone *Eleutherodactylus*

- A. Disks of fingers and toes scarcely noticeable, not twice as wide as digit.
- B. Toes webbed at base.
- C. Quite smooth above; a black face patch; eyes red in life.....*gollmeri*

- CC. Extremely rugose above; uniform blackish; large.. *bufoniformis*
- BB. No web at base of toes.
- C. Rugose above; small; uniform white below..... *polyptychus*
- CC. A marked (-shaped wart above; large; marbled below.. *biporcatus*
- AA. Disks of at least some fingers twice as wide as digit, noticeable.
- B. Toes webbed at base; disks only on fingers; belly smooth.
- C. More rugose above; thighs black behind with white spots; snout shorter; web not to more than 1/4 length of toes... *fitzingeri*
- CC. Smoother above; thighs uniform brownish red behind; snout longer; web more than 1/4 of toes..... *longirostris*
- BB. Toes not webbed at base; disks on fingers and toes.
- C. Belly rugose; no marked vocal sac; feet rather long.
- D. Tympanum visible.
- E. Nearly uniform light gray above; a few black marks on head; sometimes a W-shaped black scapular mark; black in thigh and shin; nearly smooth above; heel to snout; tympanum 1/2 eye..... *ockendeni*
- EE. Marbled irregularly with dark above; tympanum less than 1/2 eye.
- F. Red in thigh and shin; disks smaller; belly light; heel beyond snout; a W-shaped scapular wart; tympanum 1/3 eye..... *cerasinus*
- FF. Black in shin and thigh; disks larger; belly marbled; irregularly warty above; tympanum 1/5 eye.....
..... *ventrimarmorata*
- DD. Tympanum absent; small; red in groin; oblique bars on sides..... *lutosus molinoi*
- CC. Belly smooth; a marked vocal sac in male; feet peculiar, short..
..... *diastema*

The Genus *Centrolenella*

Dunn (1931 & 1933) made a number of interesting observations on these frogs of the Family *Centrolenidae* at Barro Colorado Island in the central Canal Zone, and at El Valle de Anton, Panama. From Barro Colorado he reported two calling males of *C. parambae* on a bush above a stream on the night of 20 November. The

note was "tsee." The male is characterized by a green vocal sac. *C. prosoblepon* is represented from the island by two specimens in the collection of the University of Michigan. Notes on *C. fleischmanni* by Dunn (for Barro Colorado) follow: "The eggs are laid on the under sides of leaves above streams.... My first were November 21, twenty feet up on a palm leaf. On the next pinnate piece of the leaf a male was calling. On another pinnate piece was a later batch of eggs. The chances are these two batches were laid on the nights of November 19 & 20 respectively. This looks like a case of a male taking a calling station and mating two successive nights and calling for a third mate. They were noticed calling on November 26.

"On July 18 they were calling and eggs were noted in the stream valleys on both sides of the [Barro Colorado] laboratory both high up in palms and low down in bushes. Again I noticed two batches of eggs in different stages associated with a single calling male. Calling males might be with or without eggs. I got eggs again on July 21 and they were calling on July 23."

From El Valle de Anton, Dunn wrote: "Five *Centrolenella* including a mated pair, were taken in the woods. The mated pair is undoubtedly *C. pulveratum*. The characters of *C. pulveratum* are: bones green in life, color green in life, changing in preservative to purplish. Tympanum not concealed; finely rugose above; male and female without humeral hook; a fold of skin on outside of ulna and fourth finger; snout in lateral profile flaring, not rounded; male 27mm; female 35mm; vomerine teeth present in 7 out of 8; 2 out of 8 with few dark dots on dorsum; tips of dorsal rugosities whitish; a white line on edge of upper jaw.

"The five species of *Centrolenella* which I have seen in life in Panama and Costa Rica form two groups; I, those whose bones are white in life, whose skin color bleaches white in preservative, who have no vomerine teeth, and whose tympanum is either concealed or very indistinct (*fleischmanni* and *valerioi*); and II, those whose bones are green in life, whose color becomes purplish in preservative, who frequently have vomerine teeth, and whose tympanum is quite obvious (*prosoblepon*, *pulveratum* and *parambae*). The two most distinct species of these two groups, *fleischmanni* and *prosoblepon*, are tolerably common in lower Central America, while the others are relatively rare.

"*C. prosoblepon* has a rounded snout in lateral profile; males and some adult females have humeral hooks; no ulnar fold; smooth above; dark dorsal dots in all except 3 of the 37 specimens examined; vomerine teeth present in all except 2 specimens.

"*C. parambae* has a rounded snout in lateral profile; male with no humeral hook; no ulnar fold; smooth above; no dark dorsal dots; Panamanian specimens without vomerine teeth (certain S. A. specimens have them). I have seen what I here call *parambae* from Barro Colorado Island. Four of the specimens were taken by myself, and three of them were calling males. The note is very cricketlike and trilling. Two specimens at hand measure 20mm and 21mm.

"*C. pulveratum* as here distinguished from *parambae* is known from the mated pair from El Valle, from Chiriqui, two specimens collected by the Gaiges at Progreso, and Turrialba, C. R. The male from El Valle has dark dots on the dorsum.

"One *Centrolenella* [El Valle] was a recently transformed young and completely

unidentifiable except for genus.

"Two others I consider *C. valerioi*. One of these (24mm) is quite a counter part of the two originals (21mm). The other (26mm) agrees in most characters but the dorsal color is a general cloudy-green, not like the other three with their green chain markings. Both had the white bones and the golden iris and the prominent nostrils, differing from *fleischmanni* in the two latter characters, and the note of the cloudy-green one was a trill, quite different from the shrill 'tsee' of *fleischmanni*."

Characteristics of *Centrolenella fleischmanni* are: Tympanum completely absent; no vomerine teeth; snout very flat; bones white; uniform green in life with white spots above; gular sac white; upper eyelid golden; iris silver with dark lines; no humeral hook; in preservative, white with sparse chromatophores black.

Night Collecting in the Tropics

With the advent of rainy season, night collecting becomes excellent. Beginning in May, the various species of frogs accumulate at jungle pools for their breeding activities, afterwards slowly moving into near-by areas. During the months of dry season, very few amphibians and reptiles were observed during the night. Increased activity was noted during a collecting trip on 21 May 1967. My first observation was of a large *Pseudemys ornata* sunning on a log in the late afternoon in an inlet of the Rio Cocoli (Canal Zone). At 7 p.m., two *Hyla ebraccata* were collected at a jungle pool, while others were heard calling. Three small *Hyla microcephala* were found, two at about 8 p.m., and one at 9 p.m. One *Engystomops pustulosus* was found shortly after 8 p.m., and at 8:30 an adult *Kinosternon scorpioides* (157mm by 99mm) was captured while crawling along the bottom of another pond. *Bufo marinus* and *Leptodactylus insularum* were also observed, as well as a snake (unidentified) that went quickly sliding through the weeds near the edge of a pond.

On 30 May 1967, observations were made at a single pool near Cocoli, Canal Zone. Two *Kinosternon leucostomum* were taken in the pool, one at 8:15 p.m. (55mm by 42mm), and one at 8:30 p.m. (150mm by 90mm). The water in the pool was muddy. The turtles were found by shining a flashlight on the surface, to detect protruding heads. Those out in the center are not normally obtainable because of the mud (except early in May before the pond reaches its fullest depth), but specimens closer to shore can be caught by wading. Many submerge and quickly dart out to deeper water when approached, so it is not unusual for half of those observed on any one night to escape. On branches, twigs or young trees in the pool, *Basiliscus basiliscus* will often be seen sleeping, and on this particular night two such lizards were captured by wading out to them. Sometimes these lizards will dive into the water and disappear when disturbed, and on several nights I have heard loud splashes, which, no doubt, were the lizards dropping off branches. Other species collected were *Hyla phlebodes* (Fig. 2), *Hyla ebraccata* and *Phyllomedusa callidryas* (Fig. 3). The latter tree-frog is, without a doubt, the most beautiful frog I have encountered in Panama. It is bright green above, white below, and often has a few white warts on its back. The toe pads are a brilliant orange and the eyes are a bright, deep red. One egg mass of this species was seen hanging from a leaf about six feet above

the pond, while egg masses of *Hyla ebraccata* were seen atop leaves closer to the water.



Fig. 2--*Hyla phlebodes* from Cocoli, Canal Zone.

Fig. 3--*Phyllomedusa callidryas* from Cocoli, Canal Zone.

The following night (31 May) I returned to the pool again, and found two *Hyla ebraccata* and two *Phyllomedusa callidryas* between 7:30 and 9 p.m. I also observed one pair of *Hyla microcephala* mating on a twig about a foot above the pond.

My next observations were made at this pond on 18 June. Along a road near the pool I first recorded one *Engystomops pustulosus* at 7:15 p.m., a *Bufo marinus* at 7:20, a DOR *Spilotes pullatus* at 7:25 and one *Leptodactylus quadrivittatus*. At the pool itself, one *Phyllomedusa callidryas* was found between 7:30 and 7:50 p.m. and three between 8 and 8:30. Two *Hyla ebraccata* were collected, and one *Hyla phlebodes* as well as one *Bufo typhonius*. Egg masses of *Phyllomedusa* and *Hyla* were observed above the pond. *Hyla* eggs (Fig. 4) are usually on the upper sides of leaves, while those of *Phyllomedusa* hang below them. Also, in most cases *Phyllomedusa* calls from higher positions. On several occasions I have observed or heard the frogs calling without being able to reach them. Returning from the jungle pool I encountered a DOR *Iguana iguana* that had just been killed. Beside the lizard were ten eggs, nine of which were intact (Fig. 5).

On the night of 20 June, while collecting at some marshy rain ponds near the Panama Canal, I found one specimen of the warty *Hyla Boulengeri* on a stalk 7 to 8 feet up at 7:30 p.m.. At the same location one *Hyla microcephala* was taken at 7:50, and a *Hyla stauferi* at 7:55. Other *Hyla microcephala* and *Engystomops pustulosus* were heard calling. At 8:45 p.m., along a near-by road, I found two DOR Cat-eyed Snakes, *Leptodeira* sp. (Fig. 6). One had numerous eggs near its body, all of which were broken except one.

An interesting find was noted on 4 July 1967. At the same ponds near the

Canal I found a treefrog, *Hyla microcephala*, hopping in the weeds at 2:45 in the afternoon.

On 9 July 1967, I made the first of three consecutive field trips to the previously mentioned jungle pool under somewhat different climatic conditions. During the day of 9 July the weather was partly sunny through the afternoon, during which time a large *Iguana iguana* was seen in a tree. An adult *Pseudemys ornata* was caught while sunning on the shore at the edge of a pond (a juvenile *ornata* was found DOR). *Ameiva ameiva* and *Leptodactylus insularum* were also observed, all of which were in the vicinity of Cocoli, Canal Zone. It became cloudy later in the afternoon, with a light steady rain beginning about 4:40 p.m. and lasting until 5:30. This was followed by a slight intermittent drizzle through darkness, at which time I was arriving at the pond. Observations made were as follows:

7:30-8:00 p.m.:

- 1 *Phyllomedusa callidryas* collected
- 1 *Hyla ebraccata* collected
- 1 *Hyla* (transforming) found
- 1 *Kinosternon leucostomum* missed
- Hyla* eggs observed

8:00-8:30 p.m.:

- 2 *Phyllomedusa callidryas* collected
- 1 *Hyla Boulengeri* collected
- 1 tiny *Eleutherodactylus fitzingeri* found on leaf
- Pair of *Hyla phlebodes* found mating

8:30-9:00 p.m.:

- 1 *Phyllomedusa callidryas* collected
- 2 *Hyla ebraccata* collected
- 1 *Kinosternon leucostomum* collected (137mm by 83mm)
- 2 *Kinosternon leucostomum* missed

The following day (10 July) was clear with no rain falling. The following observations were made:

7:40-7:45 p.m.:

- 4 *Kinosternon leucostomum* observed (2 were caught)

7:46 p.m.:

- 2 juveniles *Pseudemys ornata* were caught floating on the surface of the pond; these were near one another and I was able to grab them both at the same time with one hand. Measurements were 52mm by 47mm and 45mm by 35mm

Fig. 4--*Hyla* egg mass atop
leaf at jungle pool
near Cocoli, Canal
Zone.

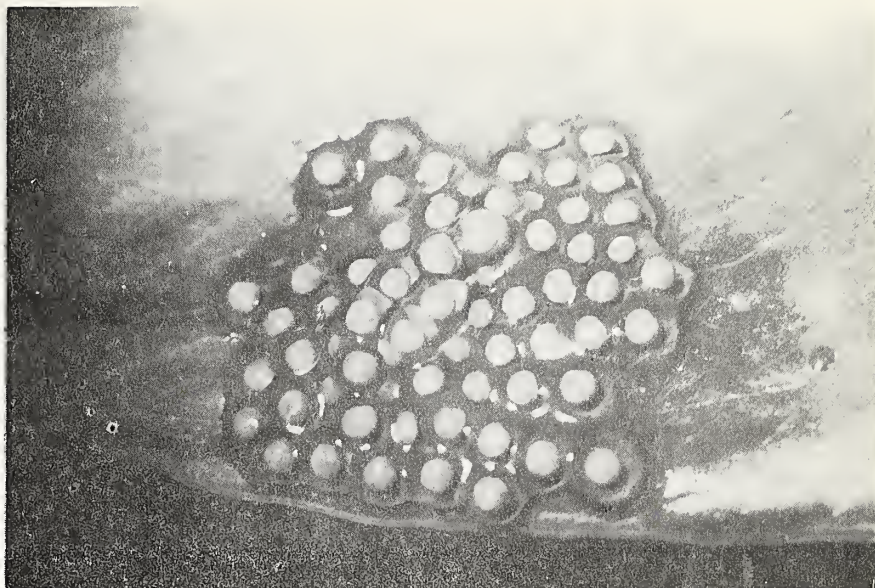
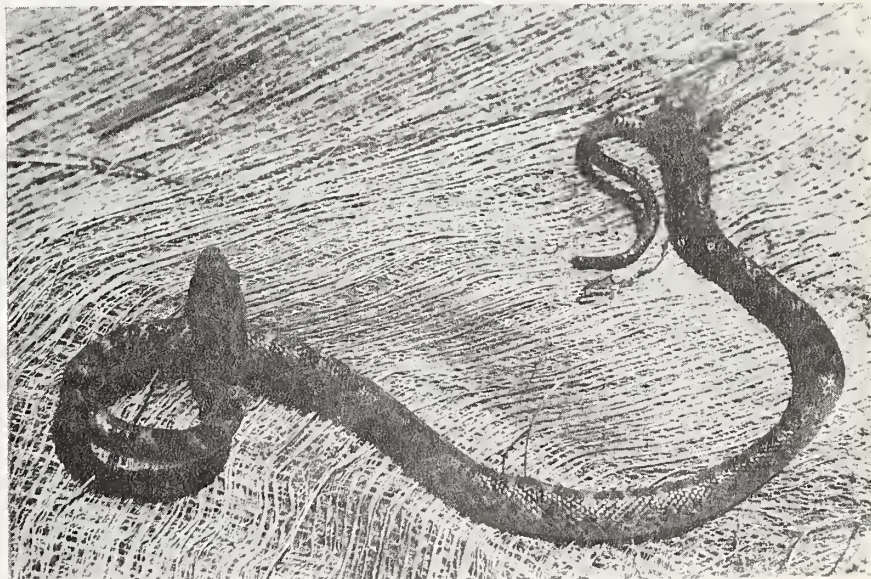


Fig. 5--Eggs of *Iguana*
iguana.

Fig. 6--Juvenile *Leptodeira*
sp. from the western
Canal Zone.



7:47-7:55 p.m.:

3 *Kinosternon leucostomum* were missed

7:55-8:15 p.m.:

1 *Hyla phlebodes* collected

1 *Leptodactylus pentadactylus*, was caught on shore at the edge of pond.

1 *Basiliscus basiliscus* was seen on a twig several inches above the water.

8:15-8:20 p.m.:

1 *Kinosternon leucostomum* collected

Additional *Hyla phlebodes* and *Hyla ebraccata* were heard or observed but not collected. Measurements of the 3 Mud Turtles taken were: 47mm by 36mm; 92mm by 64mm; and 90mm by 61mm.

On the third day (11 July) there was a tremendous downpour from approximately 3:30 to 4:30 p.m., which slackened afterwards and stopped about 6 p.m. This left everything quite wet at the pond, though no more rain fell while I was there. Observations were:

7:20-8:00 p.m.:

1 *Hyla phlebodes* collected

1 *Hyla ebraccata* collected

1 *Kinosternon leucostomum* missed

Mass of *Hyla* eggs observed

8:05 p.m.:

1 *Kinosternon leucostomum* collected

8:05-8:45 p.m.:

2 *Kinosternon leucostomum* collected

1 *Kinosternon leucostomum* missed

1 *Phyllomedusa callidryas* collected

1 *Hyla ebraccata* collected

Egg mass of *Phyllomedusa callidryas* seen hanging from leaf about 7' above pond.

Measurements of the 3 Mud Turtles collected on 11 July were: 80mm by 55mm, 76mm by 57mm, and 65mm by 47mm.

One egg mass each of both *Hyla* and *Phyllomedusa* were observed at the pond on the night of 29 July. That of *Phyllomedusa*, which is identified by the greenish hue of the developing tadpoles, was only a few inches above the water, while the *Hyla* eggs were about a foot above the surface. On this particular night none of the calling *Phyllomedusa callidryas* were lower than 7' above water

level. Two specimens were caught, but several others were beyond reach. One of the two red-eyed treefrogs was in a location difficult to reach. I caught it by extending a long thin stick up the tree and gently poking the frog from the front. This caused the specimen to move about slightly and then onto the stick, at which time I slowly brought it down to within my reach. Transforming specimens of both *Hyla ebraccata* and *Phyllomedusa callidryas* were seen on leaves about the pond, and mating pairs of *Hyla ebraccata* and *Hyla phlebodes* were observed (both species were calling). I found *Bufo typhonius* calling in this pond for the first time, and four individuals were collected. I also captured two *Basiliscus basiliscus*, both on twigs only inches above the water. One juvenile *Pseudemys ornata* was found floating on the surface. Two *Kinosternon leucostomum* were missed, and numerous *Leptodactylus pentadactylus* were heard "whooping" in the surrounding woods.

Notes on Additional Species

The genus *Dendrobates* comprises an interesting and colorful group of frogs. *Dendrobates auratus* is relatively large for this genus (35 to 40mm) and is strikingly marked with an irregular pattern of black and metallic green. The smaller *Dendrobates pumilio* (20mm) is deep red both above and below. The forefeet, hind feet and thighs are black, flecked with metallic green on the dorsal aspect, and metallic pale blue on the ventral aspect. Some individuals have the red dorsal body color peppered with tiny flecks of black.

In 1953, Trapido described a new species from Panama, *Dendrobates galindoi*. The frogs were discovered on the island of Bastimentos, 14 miles east of Almirante, at the edge of a village on the northwestern shore of the island. Here a sizable patch of the large-leaved terrestrial plant *Xanthosoma violaceum* is grown for its tuberous edible root. The little frogs were found to be extremely common not only on the leaves and petioles but also in the axils of these plants, as well as on the ground shaded by the large leaves. It is in accumulations of water in the plants' axils that the tadpoles develop.

Description (Trapido, 1953): "A small (20mm) *Dendrobates* presumably related to *D. pumilio*, but with the red dorsum punctate, maculate, or longitudinally barred with black. The venter is enamel white, not red as in *pumilio*. The fingers, toes, legs, and thighs are light, spotted or maculate with black or brown, not black flecked with metallic green or blue as in *pumilio*. There is a chromatic form comprising a small part of the population with the ground color of the dorsum cream, pale yellow or green, rather than red. The body is finely rugose as in *pumilio* but is slightly longer and stouter, and the terminal finger disks are more expanded... Some have only small flecks of black on the red dorsum, while at the other end of the series the spots may be fused to form incomplete longitudinal bars... All specimens have at least some black marks. While the venter is usually immaculate white a few specimens have occasional black spots irregularly distributed on the belly. The dark markings of the dorsal aspect of the hind limbs vary in size and intensity. When the marks are small, from one to two mm. in diameter, they appear black; when they are enlarged they become paler and brown in color. In specimens with very large marks the hind limbs appear blotched with brown, with only a narrow network of the red ground color between the blotches."

Trapido continued: "These frogs, at the time of year they were collected at least, seem quite colonial. In an area some thirty yards square about fifty indi-

viduals were collected in half an hour with the help of native children. Those taken represented only a small fraction of the ones seen and not collected. During the day these frogs are very active, hopping about on the ground and on the petioles and leaves of the 'otoe.' As many as three or four could be seen at a time crouched in the axils of these plants, both in the water and on the petioles just out of the accumulated water. In this ecological niche their poison secretion must be of considerable survival value, for a number of domestic fowl were foraging in the patch of 'otoe' but they made no attempt to eat these bright red frogs. No other frogs were seen in the area.

"A number of these frogs have been kept alive in terraria in the laboratory for several months, where they do very well feeding on fruit flies (*Drosophila*) and mosquitoes (*Anopheles albimanus*), which happen to be conveniently available insects. They call intermittently during the day. The call is a series of grating insect-like chirps, from twenty to thirty in a series, commencing with well-spaced chirps that rapidly increase in frequency and end in almost a trill. The upper abdomen and pectoral region are considerably inflated during calling, the throat only moderately so. Single chirps are also given with fair frequency. The frogs are active during the day, as are other *Dendrobates*, and readily climb the glass walls of terraria to pursue mosquitoes resting on the covering screen. At night they are quiescent, for the most part resting in groups toward the tops of the leaves of plants in the terrarium."

The "Golden Frogs of El Valle," *Atelopus*, have in recent times become the subject of much attention, both in Panama and elsewhere. A number of the colorful amphibians have been sent to California for display in San Francisco's Steinhardt Aquarium, where they presented somewhat of a challenge. It was found, for instance, that they would feed only on an insect shipped in from Texas, in addition to requiring the correct temperature, humidity and physical surroundings. In its natural habitat, these golden-colored frogs with black markings may be found in the full sunlight, sitting on rocks in streams. At night, they sleep on the leaves of trees. They are not especially timid nor easily frightened, and the skin is toxic.

The Golden Frog has long been a unique tourist attraction at El Valle, but because of the vast number of specimens collected, it is a rare occurrence when one of these frogs is seen along the mountain streams or on the forest trails of the valley. Some small stores in the valley keep them as attractions, and sometimes native children will have them in jars. These are about the only places where they will be encountered.

Their appeal as souvenirs threatens them with extinction, a threat that has been recognized by the Panamanian Government. As of 30 January 1967, a five dollar fine has been placed on the collecting of these frogs. This fine, though small, is at least a step in the correct direction for the preservation of the "Golden Frogs of El Valle."

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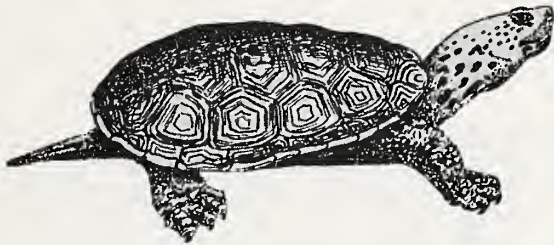
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THE REPTILES OF MARYLAND
AND THE
DISTRICT OF COLUMBIA

by Robert H. McCauley, Jr.
United States Public Health Service

A carefully detailed coverage of the distribution and life histories of Maryland snakes, lizards and turtles. Contains 194 pages, 46 distribution maps, black and white photographs of 48 forms, and a comprehensive bibliography to 1945. Members price, \$1.60 postpaid; non-members, \$1.75 postpaid. Order from: Natural History Society of Maryland, 2643 N. Charles Street, Baltimore, Maryland, 21218.

THE DISTRIBUTION OF THE MOLE SNAKE IN MARYLAND--The mole snake, *Lampropeltis calligaster rhombomaculata* (Harlan), has been found with considerable regularity in certain parts of the inner Coastal Plain of Maryland. Its apparent absence from other Coastal Plain counties led local workers to view its range as a diagonal finger-like projection running from the Potomac River near Washington to northern Anne Arundel County, including the southeastern periphery of Montgomery County, the upper half of Prince George's County, and the District of Columbia. Specimens were also known from the Eastern Piedmont, in Montgomery County and the District. The recent discovery of this snake in two other Coastal Plain counties necessitates a change in past opinion and clarifies its distribution within Maryland, the northern limit of its range.

Two adult *rhombomaculata* were found DOR on October 15, 1960, just south of Pomfret, Charles County, by Duke Campbell, Richard Franz and myself. They were within a quarter mile of each other on Md. 227 approximately 1.7 miles north of its junction with Md. 225, in a heavy oak association. The first had been dead for at least two days, and the second for approximately 4-6 hours. These specimens are Nos. R3013-14 in the collection of the Natural History Society of Maryland (NHSM).

On November 1, 1960, a third Charles County specimen was found DOR on Md. 381 in the Cedarville State Forest by Robert S. Simmons and Duke Campbell. This snake, freshly killed and in excellent condition, was found at 1 p.m. and is in the collection of Dr. Simmons. He has indicated that this is probably the latest recorded date for an active specimen of this snake in Maryland.

Following the October 15 discovery, Campbell and I devoted October 16 to a day and night search of the likely collecting spots in St. Mary's County. Although we found 29 snakes of nine species, no mole snakes were found. In late October a letter, which added to our understanding of this snake, was received from Karl Krumke III of Washington D. C., who with his son, spends most of every spring and summer at Piney Point, St. Mary's County. With the letter was a list of snakes of this locality including a *rhombomaculata* verified by Dr. Doris Cochran of the United States National Museum. Mr. Krumke also informed me of a specimen found DOR near Leonardtown on October 11 or 12. Thus, I feel that the mole snake is obviously an indigenous resident of St. Mary's County.

Despite the fact that it has not yet been taken in Calvert County (most of which is a peninsula), the range of *rhombomaculata* apparently encompasses the entire inner Coastal Plain south of Baltimore City and encroaches on the Piedmont in the Potomac River Valley and vicinity.--John E. Cooper, *Department of Herpetology, Natural History Society of Maryland, and Baltimore City College, Baltimore, Md.*

Ed. Note: Since the original publication of this article in July 1961, another Charles County specimen has been located; Mr. Henry Trevathan collected, on 3 July 1967, a female mole snake near Pomonkey, off Md. Rt. 227. The specimen deposited 11 eggs from 7 July--9 July 1967 while in the possession of Robert G. Tuck of the United States National Museum, Washington, D. C. The specimen is catalogued RGT 2123

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An Unusual Hognose Snake from Blount Island,
Duvual County, Florida.

On 30 March 1967, the author collected an unusual hognose snake. The snake was found on a small island near Clabboard Creek in northeastern Florida. This island is within the range of two species of hognose: *Heterodon platyrhinos* and *Heterodon simus*. The specimen (Fig. 1) was a thirty-six inch gravid female, with unusual dorsal coloration. The snake had a jet black ground color, with eighteen oval gold spots on the upper portion of its body, and fourteen gold bars on the lower portion. The snake had some unusual external characteristics which seemed to indicate that it could possibly be a hybrid of the two species.

The two characteristics most commonly used to determine the species of a hognose snake are the shape of the snout and the ventral coloring of the tail. In *H. simus*, the snout of the specimen is turned up sharply and the coloring of the ventral tail surface is the same as, or slightly darker than, the coloring of the remaining ventral surface. In *H. platyrhinos*, the snout is only slightly turned up and the ventral tail coloring is lighter than the coloring of the pre-anal ventral surface. In this specimen, the snout is not as pronounced as that of *H. simus*, but the ventral coloration is typical for that species. The snout is turned up even less than is normal for *H. platyrhinos*. Figure 2 illustrates these points.



Fig. 1--The Hognose Snake collected on Blount Island, Duvual County, Florida.

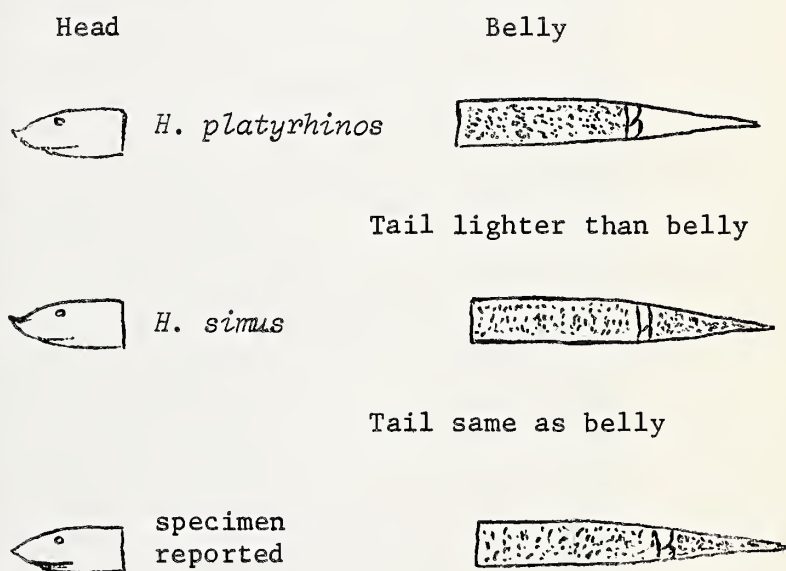


Fig. 2--Characteristics of *Heterodon platyrhinos* and *H. simus*. Diagrams taken from Conant (1958, p. 139).

Scale count, which are a more accurate way of comparing the two species, only add to the possibility of the snake being a hybrid. The following chart (Fig. 3) points out the similarity of the specimen to both species:

Fig. 3--Chart showing scale counts of *H. platyrhinos* and *H. simus* compared to the specimen. Scales counts from Wright and Wright (1957, pp. 296-297).

Scales	<i>platyrhinos</i>	<i>simus</i>	specimen
Caudals	37-60	32-55	40
Ventrals	119-150	115-150	139
Dorsal Scale rows	23-25	25-27	25

On 31 May 1967 the snake laid eighteen eggs, all of which were infertile.
--David W. Saul, 1404 Haubert St., Baltimore, Maryland.

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Photographing Live Specimens

Photographing amphibians, be they small or large, can be an exacting task. Several techniques were tried by the author and found to be very helpful.

The specimens were first placed in separate jars which contained about 1/4" of water and covered with screened lids. They were then refrigerated for about one hour. During this time equipment was set up and the proper background materials were readied. After the jars were removed from the refrigerator they were quickly placed in a plastic container which held ice and water. This had to be done because it is surprising how quickly a thoroughly cooled specimen will warm. Even the time it takes to carry the specimen from the refrigerator to the set can make a difference in its activity. This, plus set-up or positioning time, is more than sufficient for a specimen to become too active to work with. The ice also provides a method of quickly re-cooling specimens which show signs of too much activity.



This photo of *Hyla femoralis* was taken by R. S. Simmons D. D. S using approximately the same procedure as mentioned.

While positioning amphibians, especially small ones, their skin has a tendency to dry and pick up every bit of dust and dirt in the area. This hazard can be minimized or even eliminated by a spray bottle or atomizer such as an old Windex bottle. Naturally, the bottle must be completely free of its original contents. If not, the skin of the specimen will become irritated and erratic specimen movement will take place. The atomizer should be kept in the ice-filled plastic container with the specimens for obvious reasons.

This procedure may seem quite long and drawn out to some but the author has found that it makes an already difficult job a bit easier. Several prominent naturalist photographers in the Baltimore area use approximately the same procedure described here. They have found this method plus their own particular variation to be quite satisfactory for photographing amphibians.--Daniel J. Lyons, Dept. Photography, Nat. Hist. Soc. Md., 2643 N. Charles St., Baltimore, Maryland 21218.

Why Have a Preserved Collection?

When a person develops an interest in herpetology he invariably starts a collection of one type or another. Live collections are indeed popular. Information on the care of reptiles and amphibians in captivity is readily available. However, written information on starting and maintaining a preserved collection is not easily found. Most material on this subject was published many years ago and is now out of print. The reader may wish to refer to Bull. Maryland Herp. Soc., 2(4): The Preservation of Amphibians With Regard to Color Retention and Flexibility as a source for additional information on this subject.

Some people will ask, "What good is a pickled snake?" A preserved collection is visible testimony to the efforts and interests of its owner. It is not an easy task to assemble, identify and preserve reptiles. A great deal of time and knowledge must be used if the job is to be done properly. A preserved collection will also give its owner a sense of accomplishment. Accomplishment comes in knowing that a definite contribution to the knowledge of the herptofauna of an area has been made. Another benefit derived from keeping a preserved collection is that over a long period of time, the amateur herpetologist will gain a great deal of valuable field experience. Knowledge of this type must be obtained firsthand - it cannot be gotten from books.

But what about the collection itself? How is it started? How is it maintained? What should be done with rare and desirable specimens? The person who wishes to start a preserved collection of reptiles and amphibians should begin with a goal. The goal could be to make a representative collection of

all the reptiles and amphibians that are native to a local area, county or state. However, this goal must also be a realistic one. The beginner should concentrate on what he can do well. It would be unrealistic for a novice to attempt a state-wide collection if he has neither the knowledge nor the means to do so. After he has become more knowledgeable and experienced, more difficult projects could be undertaken. The advanced beginner may wish to attempt a county or state-wide collection, or to concentrate on some of the recognized problems in Maryland herpetology. (See Bull. Md. Herp. Soc., 3(3):61-62).

Starting a preserved collection presents no great problem. All species may be killed by drowning them in a 20 to 40 percent solution of alcohol. This method works quickly and the muscles will remain relatively relaxed. Numbered tags should then be tied to each specimen. The number should be written in water-proof ink and should match the number on two sets of data cards. One set of cards should be filed in numerical order, the other set in alphabetical order by genus, species and sub species. Specimens should be preserved by injecting the limbs and body cavity with a preservative until they are full and firm. One part of formalyn (37%) mixed with ten parts of water is a good preservative for large thick-skinned specimens. A dilution ratio of 1-to-20 will suffice for small thin-skinned specimens. The specimens should then be immersed in the preservative. Snakes should be neatly coiled and their jaws propped open with cardboard. This may be removed after the snake has "hardened." Salamanders, frogs, turtles and lizards may be placed in natural positions. Freshly preserved specimens should be allowed to "harden" in the preservative, for about 24 hours and should then be transferred to their permanent containers. Standard wide-mouthed jars with plastic lids should be used. Specimens of the same species should be stored together regardless of their numerical order. Different species may be grouped in evolutionary or in alphabetical order with ample space left for expansion (enough for the completion of the goal). The entire collection should be stored in a cool dark place. This will reduce evaporation and retard color fading, both of which are unavoidable. The collection should be checked periodically and jars refilled when necessary.

It is surprising how fast the number of specimens in a preserved collection will grow. This is why the random collecting of large numbers of reptiles and amphibians must be avoided. It would be quite sufficient, time-wise and space-wise, to limit the number of specimens collected and preserved to one dozen. This "rule of thumb" will also depend on specimen size. For instance, it would be far more desirable to have three Black Rat snakes *Elaphe o. obsoleta* and twelve Dusky salamanders *Desmognathus f. fuscus* than vice versa. Large numbers of any species should be taken only when doing so will serve a recognized and useful purpose. Amateurs cease being amateurs when they start practicing good conservation principles.

During the course of field work, rare or desirable specimens will undoubtedly be found. A rare specimen is one which has never been recorded, or perhaps recorded only once, from a particular locality. A desirable specimen is one which has been recorded several times from a particular locality but is found only in the large collections of recognized institutions. When specimens, which fall into either of these two categories are collected, the circumstances pertaining to their capture should be published, and the specimens donated to a recognized museum such as the United States National Museum in Washington, D. C. Many times, valuable specimens go unrecorded, and the information concerning them is lost because amateur herpetologists fail to follow these procedures. Recognition is always given to those who are willing to add to the growing "store-house" of herpetological knowledge.

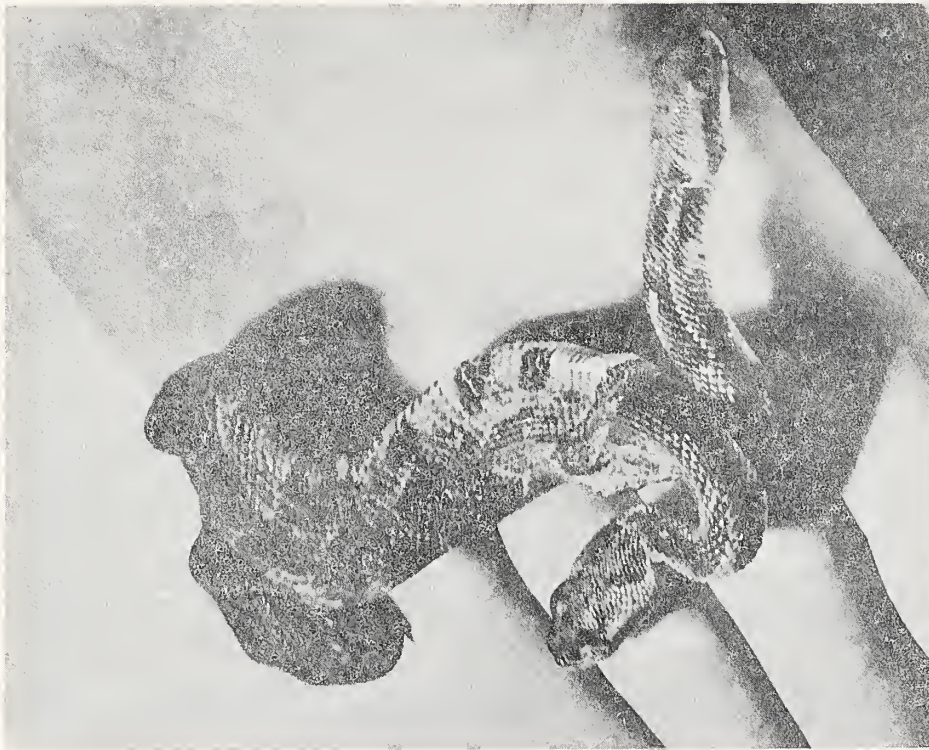
Since herpetology is becoming more popular and since more people are writing on this subject, information is valuable only if it is known - it is known only if it is in a recognized depository of such information. Advanced and professional herpetologists know about the Smithsonian Institution and the various herpetological publications - they do not know about the collection in someone's basement!

MARYLAND HERPETOLOGICAL SOCIETY

Treasurer's Report

INCOME		19 Nov. 1966 to 19 Nov. 1967
	172.45	Bank Balance 19 Nov. 1966
	181.00	Regular Membership Dues
	166.00	Subscribing Membership Dues
	51.70	Sale of Bulletin & Reprints
	<u>100.00</u>	Grant From N. H. S. M.
	671.15	Total Income Received
EXPENDITURES		
	41.35	N. H. S. M. for use of Building, Sec. Serv. Mailing, etc.
	354.77	Publication of Bulletin
	35.00	Lecture Fees
	6.20	Refund on Overpayment
	<u>53.48</u>	Program Expenses
	490.80	Total Expenditures
	671.15	Total Income Received
	<u>490.80</u>	Total Expenditures
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Daniel J. Lyons, Treasurer, 25 January 1967



The above photograph appeared in the Evening Sun Paper, Baltimore, Maryland on 21 September 1967, which prompted the following letter:

September 25, 1967

Sun Papers, Editor
The Sun Papers
Baltimore, Maryland

Dear Sir:

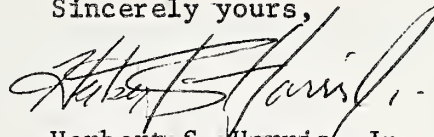
The photograph shown in the Baltimore Sun, Thursday, 21 September 1967, of a two-headed timber rattlesnake could be very misleading. This snake is poisonous as stated, and is dangerous....it is not an animal to be held in ones hand as shown in the photograph.

A layman seeing this photograph, "since pictures are worth a thousand words," would get the impression that juvenile rattlesnakes are not very

dangerous. Those who know better, wonder how a mistake such as this could have been made.

As editor of the Bulletin of the Maryland Herpetological Society, I would like a print of the photograph used in the Sun Paper for an editorial in the bulletin. Thank you.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Herb Harris, Jr.", written in a cursive style.

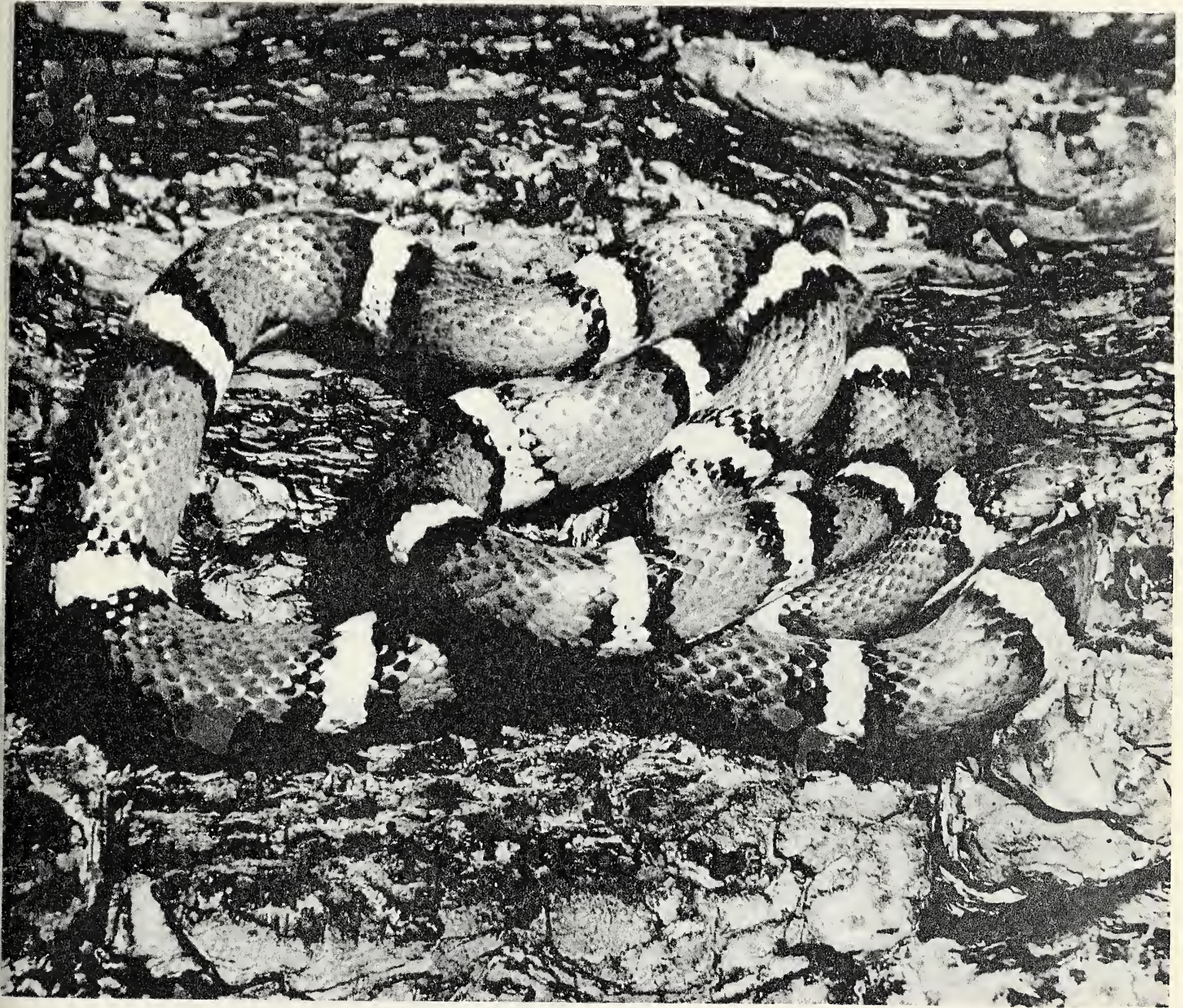
Herbert S. Harris, Jr.
Department of Herpetology

HSH:slp

JUL 3 1968

BULLETIN OF THE

Maryland Herpetological Society



JUNE 1968

VOLUME 4 , NUMBER 2

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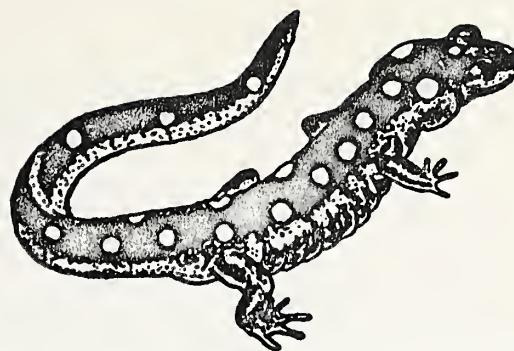
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The Cover: A *Lampropeltis d. temporalis* from Calvert Co., Maryland.
Photo by Dr. R. S. Simmons.

Ed. note: Manuscripts being submitted for publication should be typewritten (double spaced) on good quality 8 1/2 by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by author. Reprints are available at \$.01 a page (\$.02 a page with photographs) and should be ordered when manuscripts are sent in.



Volume 4 Number 2

June 1968

The Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland, Inc.

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HERPETOLOGICAL NOTES FROM ALONG THE COLOMBIAN AND BRAZILIAN
RIVERS VAUPES, QUERARI, AND PAPURY

Ken Nemuras

The dense jungles of South America harbor a unique variety of herpetofauna, some among the most interesting in the world. During January 1967 I had the opportunity to visit this fascinating continent, and the following account is of the field notes recorded during the trip.

Our group of six left Panama on Sunday, 8 January, making one stop at Medellín in Antioquia Province, Colombia. The end of our first plane ride was Bogota, Cundinamarca Province, Colombia. Here we were joined by the final two members of the expedition, and the following morning (9 January) we started over the mountains by vehicle to Villavicencio, Meta Province. Here we boarded a small cargo plane carrying supplies to jungle settlements, and were flown to Mitú, a remote village in Vaupés Province.

The main purpose of the group I accompanied was to observe the Indians of this area, especially the primitive Macu. This is a backward tribe which the other Indians call "Sons of the Tiger," meaning they are considered non-human. We traveled largely by day, which left little time for collecting. Most of my observations, therefore, had to be made when and where time permitted.

After arriving at Mitú late in the afternoon we picked up several Indian guides and a large dugout-constructed boat, our only means of travel for the next week and a half. Mitú is situated on the Rio Vaupés (Fig. 1), which is typical of what is locally known as a "Black River." The terms "Black River" and "White River" are used extensively in this region, referring to the game the river supports. A Black River has few fish, aquatic vegetation or wildlife and consequently does not present much of a problem with mosquitoes or other insects. The White River, on the other hand, is less comfortable to travel on, but contains more fish (attracted by the insects) and wildlife. I was told there were few turtles in the river near Mitú, most having long since been captured by the local population for food. Too, the falls and rocks along many sections of the river did not make it an ideal habitat for aquatic turtles.

We stayed in Mitú only long enough to organize, then started down the Rio Vaupés (Fig. 2) and went only a short distance before stopping for the night. Early the following morning (10 January) we resumed our journey. We were to get rain for the next five days - in a season when there is supposed to be none. It seems that we had arrived in the wettest "dry" season anyone could remember. This had its disadvantages, but its advantages too, as it was no doubt responsible for my acquisition of some frog varieties that otherwise would not have been taken.

We soon came to our first series of rapids on the river, and had to unload the boat and pull it over the rocks. During this process I noticed numerous tadpoles in puddles among the rocks, but no actual frogs. These were the first herpetological specimens observed. That night we camped on an island in the Rio Vaupés, where just before dusk, several whiptail-like lizards were encountered. This was in the dry, central portion of the island. Shortly afterwards it began raining quite hard, after which time I heard a treefrog calling near camp. I attempted to locate it, and discovered it was very high in a tree.



Fig. 1--The Rio Vaupés



Fig. 2--A Colombian Indian village along the Rio Vaupés

The following morning (11 January) before breaking camp, I encountered a number of tiny frogs (the most distinguishing feature of which was an orange belly with black spots) among the damp leaves on the ground around the edge of the island. Five specimens were collected and preserved.

When we came to our second series of rapids we detoured through the jungle while the Indian guides took the boat through the rough water. The only other specimen encountered during the day was a lizard found among the rocks where we rejoined the boat at the river. Soon afterwards we made camp for the night, and apparently just in time, as the rain was again not long in coming.

At sunrise (12 January) I explored the forest along the river's edge and observed a number of small frogs among the leaves on the jungle floor. I collected and preserved three specimens, one of which was the same species as was found on the island the previous day.

Shortly afterwards we proceeded downriver to Foz do Fatima, another series of rapids. Here we left the boat and made our way along the narrow, rocky bank of the river for some distance, then moved up into the jungle when the shoreline became impassable. While climbing among the rocks during the first part of our detour I came across a large *Hyla* (Fig. 3), apparently asleep, in a small, shallow puddle. It was taken at approximately 1:30 in the afternoon - marking the first time in all my years of collecting that I have ever found a treefrog during the day. It was dark tan in coloration, and vertical hash-bars on the sides gave it an appearance somewhat resembling *Hyla crepitans* of Panama. Several other frogs were seen along the rocky shoreline at the jungle's edge and were of the same small varieties encountered previously.



Fig. 3--*Hyla* taken along the Rio Vaupés near Foz do Fatima, Colombia. Specimen was found about 1:30 p.m. in a small shallow puddle.

That afternoon we entered Brazil for the first time and halted at a small settlement, Foz do Querarí-Vaupés, at the boundary between the two countries (Fig. 4). From this point onward, one side of the Rio Vaupés would be Brazil and the other, Colombia.

At the settlement we learned that there were some Macu Indians a day's hike into the jungle from the Rio Querarí. Unlike the other Indians of the area, who inhabit the banks of the rivers, the Macu hide deep in the forest where they are least apt to be disturbed. It was decided that our party should divide, as too many strangers might scare the Macu into cover. Thus, on the morning of 13 January, half



Fig. 4--River junction at Foz do Querarí-Vaupés. The foreground is Brazil, with Colombia across the river.

the group and local guides started up Colombia's Río Querarí, while the others remained behind. The latter were to make the trip the following day. I remained at Foz do Querarí-Vaupés with the hope of exploring the Brazilian terrain. Only one specimen, an *Anolis*, was encountered in the morning. I later followed a stream into the jungle, but collected no additional specimens. In the afternoon the rain began once again; and I retreated to the camp.

That night after the rain had stopped I went to a near-by stream and immediately heard various frogs calling. This was at a point where the stream overflowed slightly, forming a small soggy area. The first specimen I located was a large *Hyla* (Fig. 5) calling in a bush. The specimen somewhat resembled the one taken in Colombia earlier, but was dark gray in coloration with several small white patches, and the hash-bars on the sides were not prominent. I snapped several photographs. The frog suddenly jumped into the water, and quickly disappeared. Later I saw the specimen in the water, but did not collect it. After my first encounter I shined my light around at random and caught sight of an unusual looking *Hyla* on a stem several inches above the shallow water. It was rough (in fact almost spiny) and mossy green in coloration, with dark crossbarred limbs and some dark marbling above (Fig. 6).

A small *Eleutherodactylus* was then observed on a leaf on the ground. At about the same time the head of a snake was seen protruding above the water (in the shallow soggy area adjoining the stream). Shortly afterwards I started to cross the stream, and another smaller snake was seen swimming along the water's edge. It quickly darted to deeper water. On the other side of the stream I observed several yellowish-green *Hyla* (Fig. 7) calling in some small bushes, and collected two specimens. A prominent feature of this species was the thigh area, which was marbled with black and yellow. One other species of Hylid (Fig. 8) was observed, but probably was not of the genus *Hyla*. This type was brownish with darker cross-bands, a yellow lip, and a white underside. Blotches and spots of yellow were present on much of the venter. The legs were long and lanky. On several occasions while the author tried to photograph them it was found they could leap considerable distances.

The following morning (14 January) it was our turn to venture up the Querarí and into the jungle. After pushing through the forest the greater part of the morning, we were met by the first party returning, and informed that there were few Macu up ahead (most having already departed to the deeper jungle). Only one or two families were encountered, and herpetologically the trip was equally poor. Only one frog was taken on the Querarí trip, a small *Leptodactylus*. We decided it was needless to continue, so we returned to the settlement the same day.

The rain had started in the afternoon, and by night everything was quite wet. Returning to my collecting spot of the night before, I was immediately met by a large *Hyla* which leapt onto the path in front of me. At the same instance I noticed a small *Bufo* close to it, and quickly grabbed the two frogs. Shortly afterwards a larger *Bufo* was seen on the other side of the stream. Two snakes were encountered, in the identical spots as those the night before. A number of other treefrogs were heard, observed, or collected, though representing no additional species.

On 15 January I picked up a tortoise shell from a Cubeo Indian (Fig. 9)



Fig. 5--Large *Hyla* from along the Rio Vaupés, taken at Foz do Querari-Vaupés. Coloration is dark grayish-brown with white patches. Note the shape of pupil.

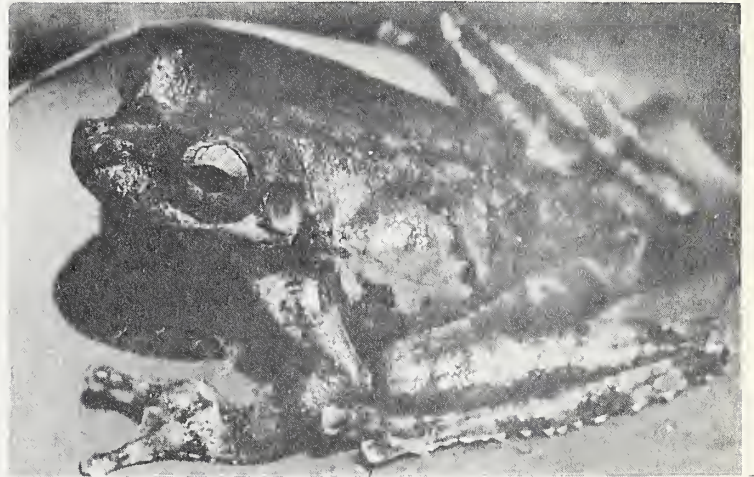


Fig. 6--Brazilian *Hyla* from Foz do Querari-Vaupés.



Fig. 7--*Hyla* collected at Foz do Querari-Vaupés, Brazil. *Hyla rubra* group.

Fig. 8--Hylid from Foz do Querari-Vaupés, Brazil. General coloration is brown, with lip and markings on underside yellow.



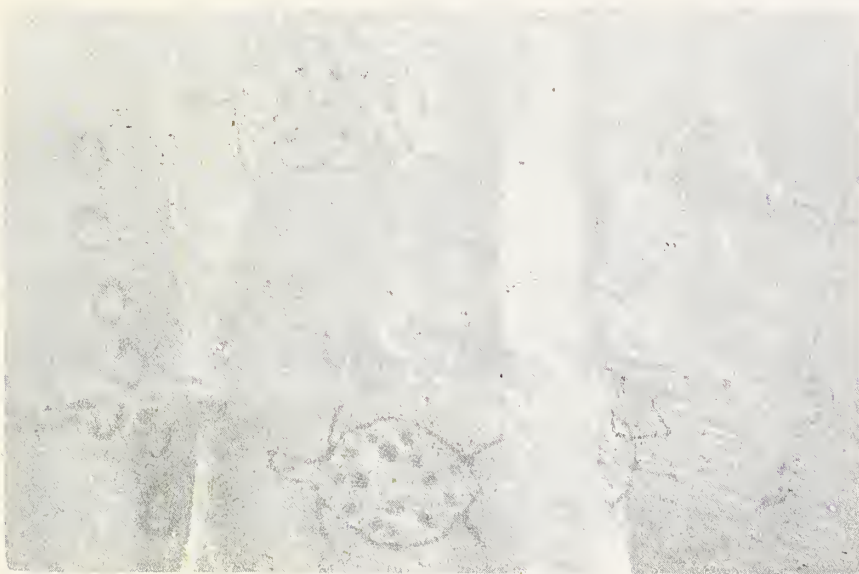


Fig. 9--Cubao Indians. A tortoise shell is held by the Indian on the right.

Fig. 10--Indian bark drawing.



Fig. 11--Cubao Indian bark drawing picturing a snake and two turtles.



at the settlement, so apparently there were testudines in the area. Several bark drawings (Figs. 10,11) by the Indians pictured turtles too, as well as snakes and other wildlife.

It did not rain that night (the first time since our arrival) but there were still some frogs near the stream. I encountered one large *Bufo* and several of the brown cross-banded variety of treefrogs. One *Hyla* was calling loudly from high in a tree beside the stream during the entire time I was there. While shining my light about the area I found a specimen of *Leptodeira annulata* crawling in a bush. I captured the nocturnal snake easily before it could escape.

On the morning of 16 January, we left the settlement and continued down the Rio Vaupés. The weather, however, was bad once again; and no specimens were recorded. We spent the night at a small village beside the river; and the next morning (17 January) resumed our journey. While detouring through the jungle around another series of rapids, I collected a small black and tan *Bufo* (Fig. 12). This was on the Brazilian side of the Vaupés. That night we reached Jauarete, Brazil, and camped across the river on the Colombian side.

On 18 January the first specimen collected was a small *Bufo*, found where we had spent the night. On the Brazilian side several of the whiptail-like lizards (with bright green tails) were observed in the morning. From Jauarete we traveled up the Rio Papury, soon arriving at another series of rapids. While the Indian guides took the boat through the rough water we followed a jungle trail for about 45 minutes (having nearly been swept over once, this was done to lighten the boat), arriving at the Tariana Indian village further up the Papury. During the walk, while crossing a log over a small stream, I looked down and caught sight of a colorful toad (Fig. 13) on a leaf just above the water level. It was easily taken.

We continued up the Papury until dusk, there camping at another Brazilian village. The journey was not far in terms of miles, but the strong current made progress slow and difficult. With



Fig. 12--Brazilian *Bufo* found along the Rio Vaupés. Lower area is black and upper region tan. *Bufo guttatus* group.



Fig. 13--Brazilian toad from along the Rio Papury, found on a large leaf over a jungle stream. Light areas are yellowish-tan and darker areas reddish-brown. *Bufo typhonius*.

the current, the return trip later was to take only about four hours. That night I heard a *Hyla* calling from a tall palm tree near the river.

At sunrise (19 January) we once again headed into the jungle in an attempt to locate a primitive Macu tribe. We pushed through the jungle at an exhausting pace all morning and afternoon, and finally came to a single hut in a clearing. When game is scarce the Indians eat such things as lizards, snails, and insects, which was more than apparent from the beetle remains scattered on the earthen floor of, and on the ground immediately around, the hut. A number of Indians arrived at the hut later that evening. This was where we spent the night.

The next morning (20 January) we were up before daylight preparing for a rapid retreat to the Rio Papury. On the return journey one small *Bufo* was picked up on a log. This was the only specimen encountered. Later, back at the Papury, several lizards were seen in dry areas around the village. From here we began our boat ride back down the river to Jauarete, Brazil.

The following afternoon (21 January) a cargo plane touched down on a small dirt airstrip near Jauarete and we were air-lifted back to Mitú, Colombia. Just before leaving I saw several more lizards in the open grass near the runway. At Mitú, Colombia, the frogs were calling before the sun was completely down. None were taken. That night it rained and afterwards I went out a second time. Several frog varieties were heard calling, but the only species collected was the brown, cross-banded Hylid similar to those collected at Foz do Querarí-Vaupés, Brazil.

Early Sunday morning (22 January) we began the last leg of our return trip, bringing to an end this eventful exploration. The dirt airstrip was now a layer of mud and a light rain was falling as we climbed aboard the small aircraft that had brought us from Jauarete, but I couldn't help looking back and hoping for another chance to venture into the jungle world of tropical South America.

P. O. Box 480, Howard Air Force Base, Canal Zone.

NOTES ON *HAIDEOTRITON WALLACEI*

Herbert S. Harris, Jr.

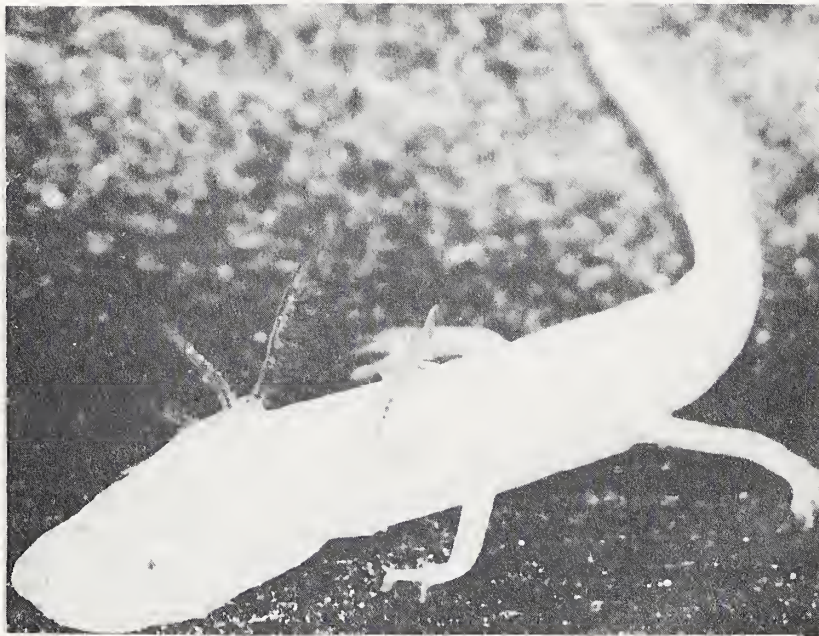
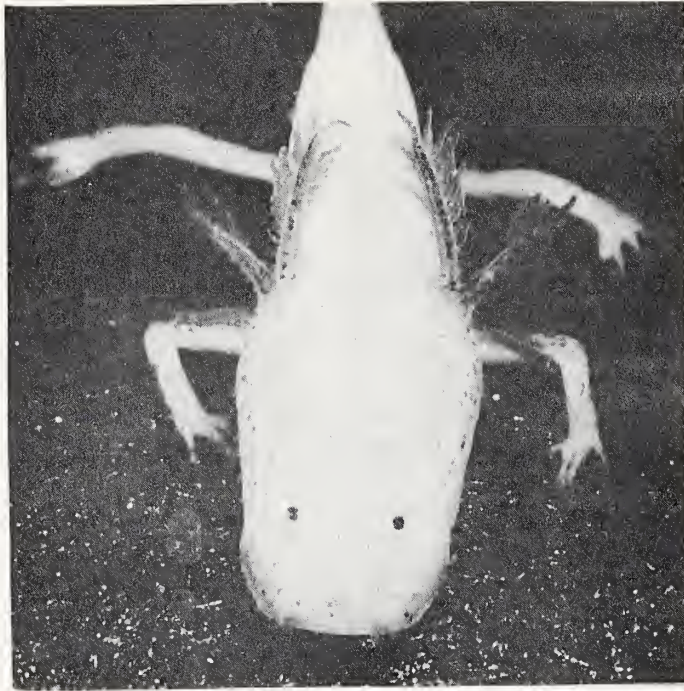
The neotenic, cave-dwelling plethodontid salamander, *Haideotriton wallacei*, was described by Carr (1939) from a single adult specimen taken from a 200 foot artesian well at Albany, Dougherty County, Georgia, on 19 May 1939. This specimen, the holotype, measured 75.5 mm total length [75.5(42+33.5)10], and so far is the largest known specimen. No other specimens of *Haideotriton* were known until December 1957, when Miller and Warren collected nine at Gerard's Cave near Marianna, Jackson County, Florida (Pylka and Warren, 1958). They saw numerous others but did not collect them. Since this time other specimens and other localities have come to light.

The few published papers on *Haideotriton* have dealt with: a comparison of its skeletal features with those of *Typhlomolge* (Hilton, 1945); the habitat, feeding, response to visual and auditory stimuli, external pigmentation and morphology (Pylka and Warren, op. cit.); the response to a metamorphic agent (Dundee, 1962); the external morphology (Valentine, 1964); additional anatomical data and information concerning relationships and evolution (Wake, 1966); and finally a summary on known data (Brandon, 1967).

In Georgia this salamander is presently known from only two localities: Albany, Dougherty County (the holotype), and a series of about 20 specimens from Climax Cave, Decatur County. The pools from which *Haideotriton* were collected in Climax Cave lie beyond a long crawlway which periodically becomes silted shut as the result of influx of water. To the author's knowledge these pools are currently inaccessible. In Florida *Haideotriton* is now known from a number of caves in Jackson County other than Gerard's Cave (Sam Smith Cave), and will doubtless turn up in some of the small caves near Gerard's which contain pools of water. This salamander should be protected, and collections made only for legitimate scientific purposes.

The specimen in Figs. 1 and 2 was collected on 16 April 1965 at Gerard's Cave by John E. and Martha R. Cooper and John E. Cooper, Jr. (Cooper, 1965). It measured approximately 24 mm total length. Notice the prominent eye spots and the dark pigment on the body. As this species grows, the eye spots and the pigment fade until, as in the holotype, these features are barely detectable. Notice the depressions in which the eye spots are located, the structure of the head, and the moderately compressed tail with its dorsal fin.

In June 1965 the author, with David Lee of Florida Southern College, visited Gerard's Cave in search of *Haideotriton*. We entered the cave around 2:00 a.m. on 4 June 1965, and devoted the next couple of days to further collecting there. Beyond the twilight zone the cave consists of a large, long room. Near the back of this room a stream flows from under a side wall into another large, long chamber. Further back in the same room, in an area where the stream flows under the wall again, is a large pool. In the first room there are three pools in which *Haideotriton* can be observed. The first of these is seen in Fig. 3. Two small *Haideotriton* can be seen on ledges in the lower center of the photograph. During this trip no salamanders were observed in the stream, but on a return trip in April 1967 (when the water level was higher) numerous individuals were observed there. The author has also found these salamanders in depressions on this and other cave



Figs. 1 and 2--An approximately 24 mm *Haideotriton wallacei*, collected in April 1965 at Gerard's Cave.

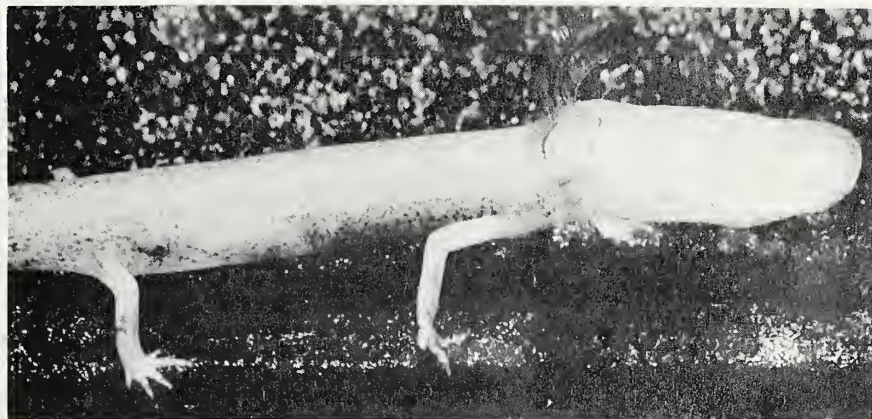
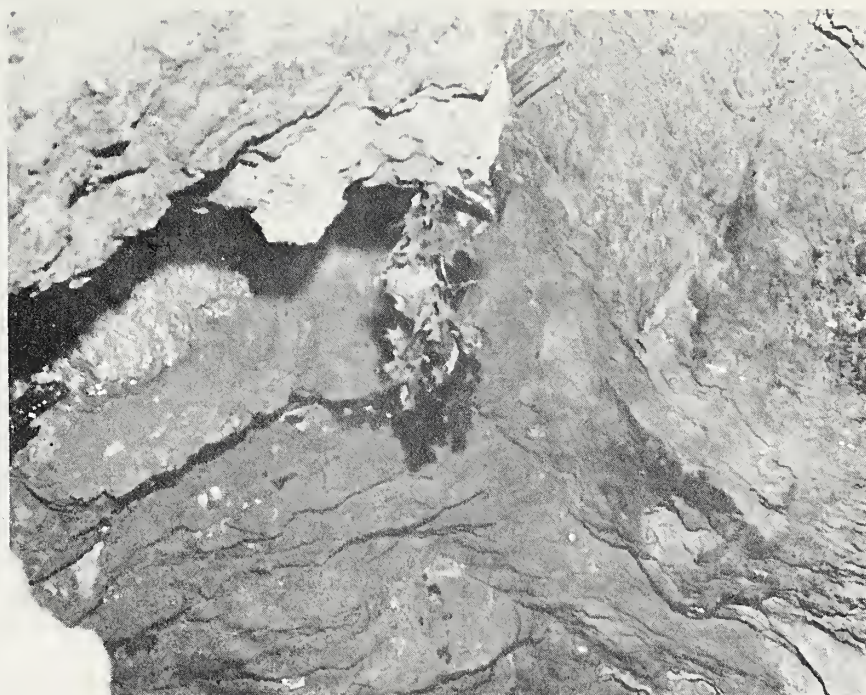


Fig. 5--The largest specimen of *H. wallacei* collected by the author at Gerard's Cave.

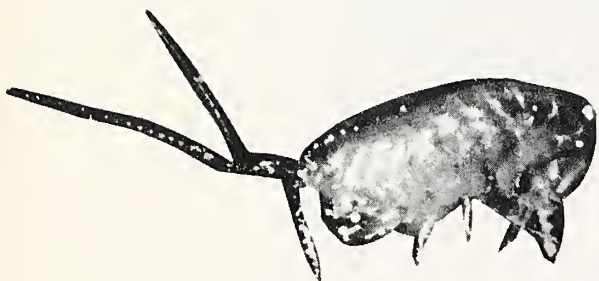
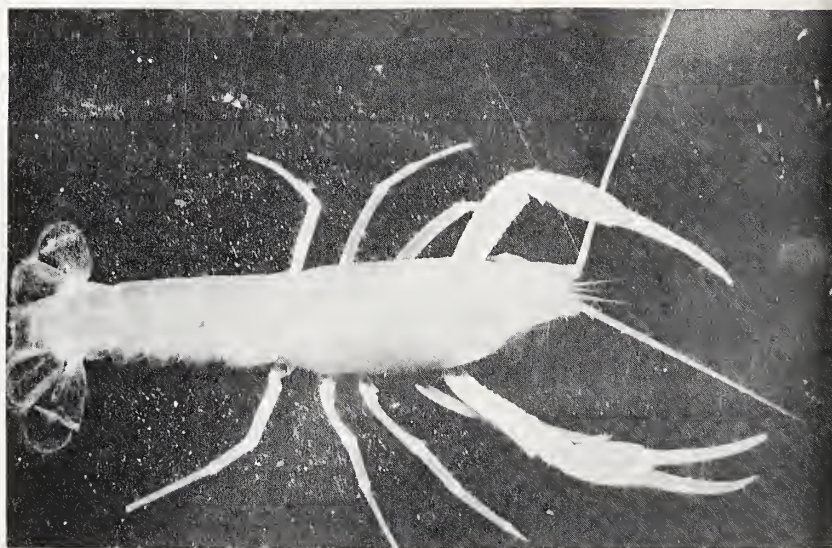


Fig. 6--The semi-epigean amphipod, *Crangonyx floridanus*, a food item of *Haideotriton wallacei*.

Fig. 7--The cavernicolous crayfish, *Cambarus cryptodytes*, which probably feeds to some extent on *H. wallacei*.



floors, where they were trapped when the water level dropped. The water level in Gerard's Cave is very high during winter and early spring but begins dropping in the late spring.

Fig. 4 shows a specimen approximately 35 mm in total length. Notice that the eye spots and pigment are less conspicuous, and that the salamander is standing erect on its thin, delicate legs.

Fig. 5 is a photograph of a large specimen with a regenerate tail, collected by the author on 5 June 1965 at Gerard's Cave. When collected the specimen measured 55 mm total length. A year later, when it died, it measured 60 mm. After preservation in 70% ethanol for six months the measurements are 57(31+26)9. Notice how much the pigment on the body has faded, and that the eye spots are now almost completely covered by skin. An excellent close-up color photograph of this specimen appears in Mohr and Poulson (1966, pp. 98-99).

The specimens of *H. wallacei* observed in Gerard's Cave on 5 June 1965 fell into three size groups. The smallest were approximately 20 mm in total length, the next larger were approximately 30 mm total, and there was a single large specimen, the one previously mentioned. Most specimens were of the middle group.

The holotype, a sexually mature female, contained large eggs (about 2 to 2.2 mm in diameter) which were apparently ready for deposition. A specimen measuring 43 mm total length dissected by Pylka and Warren was found to contain small and underdeveloped reproductive organs. The author's 57 mm specimen was dissected by Richard Highton and found to contain small ovarian eggs. Since this specimen was kept alive for a year before its death and dissection, it cannot be known whether the specimen was an immature female just starting to mature, or whether it was mature when captured and the eggs had started to be absorbed by the body.

On 5 June 1965 the temperature of the water in Gerard's Cave was 20.6°C. The pH was 8.0. Total hardness, expressed as ppm of CaCO₃, was approximately 130, and dissolved solids averaged 127 ppm for four separate samples analyzed. In the author's laboratory these animals have been kept in Baltimore City tap water, which is very similar to the habitat water in having pH 8.0, total hardness averaging about 70 ppm, and dissolved solids averaging about 143 ppm. The specimens which the author brought back have been kept at a temperature of 25.6°C., and have fed well on enchytraeid worms.

The *Haideotriton* collected on 5 June 1965 did not seem to darken in coloration during two years of captivity, in contrast to the specimens reported by Pylka and Warren (op. cit.). These specimens (the present author's) were kept in a basement laboratory which received incandescent light for a minimum of six hours per day. They died on 25 July 1967, ostensibly from extreme heat, when the laboratory was moved to a new location where the temperature could not be controlled.

At the time of their collection, the specimens mentioned above measured approximately 30 mm total length. Six months later, in December 1965, they had grown approximately 10 mm. During these six months they were fed once a week on enchytraeid worms. During the next year and a half the growth increase was only a few millimeters; the salamanders were fed only about once every month or two.

Specimen Number	1	2	3	4	5
Length in mm 5 June 1965	32	31	30	29	55
Length in mm 9 Dec. 1965	34	41	40	40	59
Length in mm 3 April 1966	-	42	41	40	60
Length in mm 1 Dec. 1966	-	43	40.5	40	-
Length in mm 25 July 1967	-	44	42	41	-

Specimen number 1 died 5 February 1966. During eight months of captivity it refused to feed. All specimens were kept in small containers measuring 6" X 10" with approximately an inch-and-a-half of water. A fragment of limestone from Gerard's Cave was placed in each container. When the specimens were not moving about in search of food they could usually be found under the edges of the limestone. The slab of limestone in the large salamander's container was braced so there was a fair-sized space between the limestone and the glass side of the aquarium. Even though the salamander could not actually wedge itself into this space, it remained at this point most of the time. Possibly it could sense the presence of a "tighter" space which afforded security. These specimens were able to detect food or disturbances several inches away.

In Gerard's Cave the troglobitic isopod, *Asellus hobbsi*, has been reported (Warren, 1961). The author has collected numerous specimens of a small, semi-epigeic amphipod, *Crangonyx floridanus*, in the cave (see in Fig. 6). Possibly *Haideotriton* feeds largely on these crustaceans.

The troglobitic crayfish *Cambarus cryptodytes* (Fig. 7) is also found in Gerard's Cave and is quite numerous there. The adults of this species may conceivably prey to some extent on *Haideotriton*, and it is also likely that the salamander is a predator on very small *cryptodytes*.

The specimens of *Haideotriton wallacei* collected on 5 June 1965 at Gerard's Cave are catalogued in the authors collection as follows: the 57 mm specimen, AS422HSH; the 34 mm specimen, AS376HSH; and the 41, 42, 44 mm specimens respectively, AS453HSH, AS455HSH, AS454HSH.

The author would like to express his appreciation to the following persons who have aided him in his study of *Haideotriton*: to Mr. John E. Cooper and Mrs. Martha R. Cooper, for information on the caves of Jackson County, Florida and on *Cambarus cryptodytes*, and for the loan of a specimen of *Haideotriton*; to Dr. John R. Holsinger for information on *Crangonyx*; to Mr. Richard D. Warren for information on the caves of Jackson County, Florida and Decatur County, Georgia; to Dr. Richard Highton for assistance in the dissection of a specimen of *Haideotriton*; to Dr. Archie Carr for information concerning the holotype; and especially to Dr. Robert Simmons for the assistance which made possible the Florida trips and for the photographs which accompany this article.

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Ed. note: Although the author did not intend to publish the above notes, he has had many requests for a copy of the brief talk on *Haideotriton* given on 8 January 1965 at the first joint meeting of the Eastern Seaboard Herpetological Societies, held at the United States National Museum. Since many of our members are interested, and since a proposed paper on the species is by no means ready for publication the author decided to present the above notes and photographs at this time.

A checklist of the Amphibians and Reptiles of
Barnstable County, Cape Cod, Massachusetts.



The following is a list of the amphibians and reptiles observed by the author in Barnstable County:

Snakes:

Lampropeltis doliata triangulum
Opheodrys vernalis vernalis
Thamnophis sirtalis sirtalis
Natrix sipedon sipedon
Coluber constrictor constrictor
Storeria dekayi dekayi
Storeria occipitomaculata occipitomaculata
Diadophis punctatus edwardsi
Heterodon platyrhinos
Thamnophis sauritus sauritus

Lizards:

Eumeces fasciatus

Turtles:

Chelydra serpentina serpentina
Clemmys insculpta
Clemmys guttata
Chrysemys picta picta
Malaclemys terrapin terrapin
Sternotherus odoratus
Terrapene carolina carolina

Salamanders:

Ambystoma maculatum
Ambystoma jeffersonianum
Eurycea bislineata bislineata
Hemidactylium scutatum
Notophthalmus viridescens viridescens
Plethodon cinereus cinereus

Frogs:

Hyla crucifer crucifer
Hyla versicolor versicolor
Rana catesbeiana
Rana clamitans melanota
Rana pipiens pipiens
Rana palustris palustris
Rana sylvatica sylvatica

Toads:

Bufo americanus americanus
Bufo woodhousei fowleri
Scaphiopus holbrookii holbrookii

The majority of these amphibians and reptiles are fairly common throughout the county. However, a few of them are somewhat difficult to find. One of these, for example, would be the Spadefoot toad (*Scaphiopus holbrookii*). The only Spadefoot toad seen by the author was one that was found while examining the stomach contents of a DOR hognose snake. As a general rule, the occurrence of specimens diminishes the further east one travels in the county.

Several reports exist of the Timber Rattlesnake (*Crotalus h. horridus*) occurring in the western portions of the county. Most of these reports come from the vicinity of the Falmouth Town forest and the Otis Air Force Base area. However, the author has never observed any specimens, either alive or dead, therefore it has been omitted from the checklist. There is the possibility of a relic population of Timbers in this area, but they are, by no means, found throughout the county. Also, Conant (1958) show *Hyla v. versicolor* as occurring in Cape Cod. This species has never been seen or heard by the author.

I wish to thank Harold Backus and David Grahm for helping to locate many of the above specimens.

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--David Saul, 1404 Haubert St., Baltimore, Maryland 21230.

THE SPADEFOOT TOAD IN MARYLAND

by

Romeo Mansueti

The spadefoot toad, *Scaphiopus holbrookii holbrookii* (Harlan), is one of the strangest and wierdest-looking Anurans of Maryland. On the Coastal Plain of the Eastern seaboard its rarity is accounted for by its secretive, burrowing habits, and its short breeding period. Burrowing underground during the day, and emerging at night to hunt for food, the spadefoot toad is easily one of our queerest amphibians. The spadefoot toad receives its name from the large, dark, spade-like or horny process on the inner sole which is used as an aid in digging burrows. It is the only Maryland amphibian with elliptical pupils; an indication of nocturnal habits. Although it resembles a toad, it is not a true Bufonid, but is really a Scaphiopodid, which is perhaps the most primitive toad family of Eastern North America.

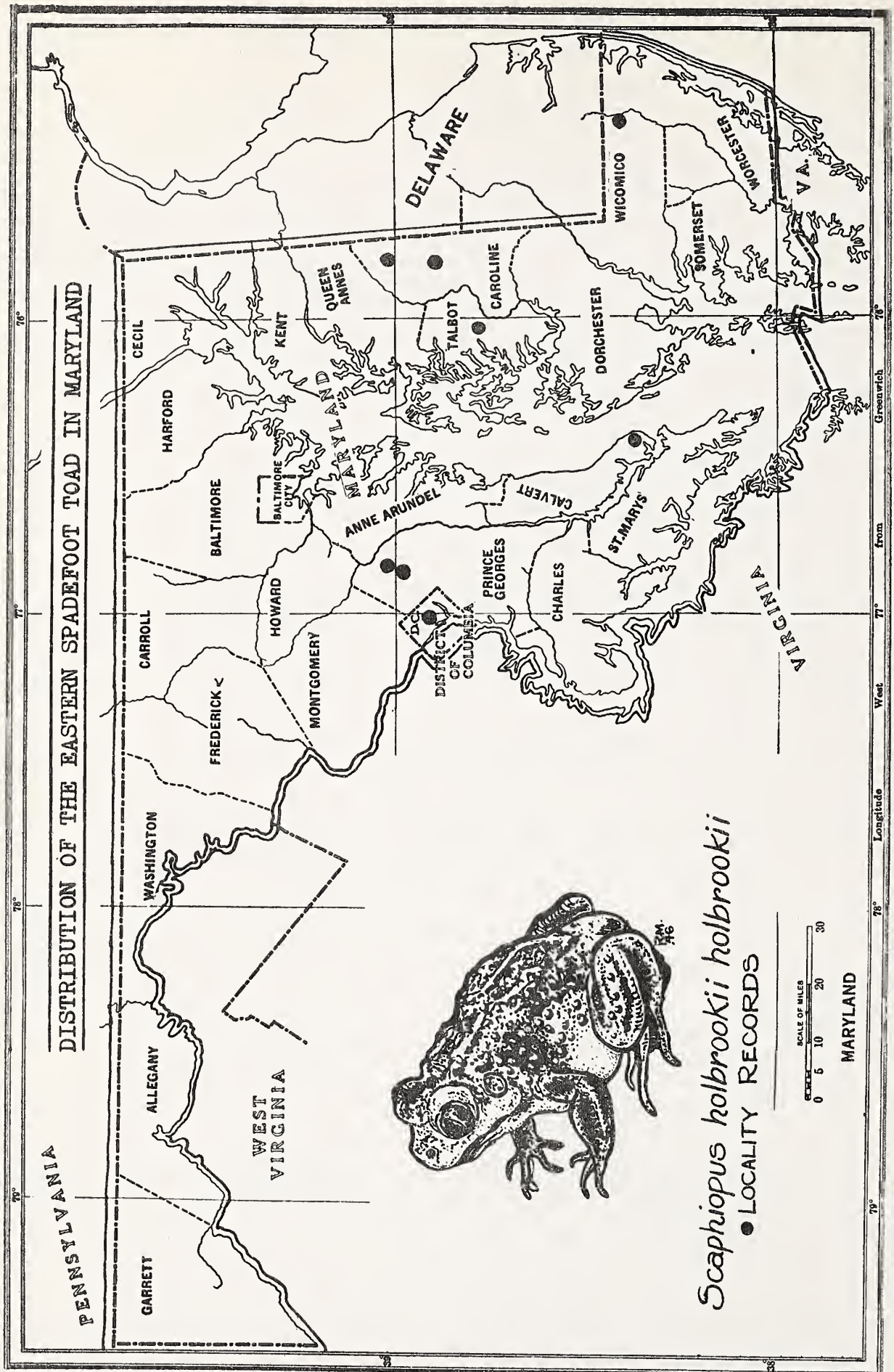
Its occurrence in Maryland is extremely sporadic as may be noticed by the records. Hay (1902 - A LIST OF THE BATRACHIANS AND REPTILES OF THE DISTRICT OF COLUMBIA AND VICINITY, Proc. Biol. Soc. Washington Vol. 15, Pp. 121-145) records the species in his study, but cites no particular locality. He comments upon its rarity. Conant (1945 - AN ANNOTATED CHECK LIST OF THE AMPHIBIANS AND REPTILES OF THE DEL-MAR-VA PENINSULA, Soc. Nat. Hist. Delaware Pp. 1-5) officially lists it from Maryland on the basis of specimens from widely scattered Eastern Shore counties. Fowler (1945 - THE AMPHIBIANS AND REPTILES OF NATIONAL CAPITAL PARKS AND THE DISTRICT OF COLUMBIA REGION: U. S. Dept. Int., Nat. Pk. Serv., Washington, Pp. 1-4) also lists it as rare from the Washington area, but cites no definite records.

It is significant to point out that areas where extensive collecting has been carried on, such as the Patuxent Research Refuge at Bowie, Maryland, fossorial and little-known forms are readily uncovered. Mr. F. M. Uhler of the Food Habits Section of the Patuxent Research Refuge very kindly allowed me to examine a large series of spadefoot toads from that immediate area. Mrs. Lucille F. Stickel, Biologist of the Economic Investigations Laboratory, very graciously supplied me with detailed notes of the records which are reproduced below:

<u>Date</u>	<u>Locality</u>	<u>Collector</u>	<u>Remarks</u>
13 July 1941	One mile east of Glenndale and one mile south of Springfield, Maryland	Ford Wilke	Many calling in a pool about 10 inches deep in mixed pine, oak, and sweet- gum area.
29 July 1941	Bowie-Laurel Road at Refuge	Leonard M. Llewellyn	Found on road at midnight after shower.

Reprinted from Maryland, 1947, XVII, No. 1, pp. 7-9, 12-14, with the permission of the Natural History Society of Maryland.

<u>Date</u>	<u>Locality</u>	<u>Collector</u>	<u>Remarks</u>
25 July 1942	Window pit in head- quarters area at the Refuge.	Lucille F. Stickel	
30 July 1942	"	"	
31 July 1942	"	William H. and Lucille F. Stickel	Three specimens collected.
9 August 1942	"	Lucille F. Stickel	
10 August 1942	Window pit of resi- dence	Margaret Coburn	
6 September 1942	Window pit in head- quarters area	Lucille F. Stickel	
10 September 1942	"	"	
13 September 1942	Moist forest area near headquarters area	R. E. Stewart and W. O. Pruitt	Recently trans- formed young.
21 September 1942	Terrace area about 1/2 mile from headquarters	W. R. Greiner	Recently trans- formed young.
27 September 1942	Window pits in head- quarters area	Lucille F. Stickel	Five very small juveniles and one adult.
20 September 1942	Forest Service head- quarters near Bowie	William H. and Lucille F. Stickel	
15 October 1942	Window pits in head- quarters area	Lucille F. Stickel	One very small juvenile and one adult.
15 October 1942	Crushed in driveway in headquarters area	"	
16 October 1942	Window pit in head- quarters area	"	Very young juvenile
19 October 1942	Window pit in head- quarters area	Lucille F. Stickel	Very small juvenile
23 October 1942	"	"	"



<u>Date</u>	<u>Locality</u>	<u>Collector</u>	<u>Remarks</u>
26 May 1943	Window pit in head-quarters area	Lucille F. Stickel	Very small juvenile
3 August 1945	"	William H. Stickel	Adult

In addition to these records, Dr. Remington Kellogg of the Division of Mammals of the United States National Museum has recorded these toads in fair numbers in the vicinity of Woodridge, District of Columbia. He informs me, however, that their habitat, of pine and sandy nature, has been destroyed by housing projects.

That their distribution over Maryland is probably widespread in the Coastal Plain region is exemplified by the capture of several juveniles from Cove Point, Calvert County, Maryland. Mr. James A. Fowler, who collected these small spadefoot toads, informs me that he has found no adults after several years of diligently looking for the species at this locality. Dr. Robert H. McCauley, Jr. has collected a specimen from Denton, Caroline County (USNM 104406), and another is deposited in the Washington College Collection (#57) from Goldsboro, Caroline County.

Mr. Roger Conant, Curator of the Philadelphia Zoological Gardens, in connection with his study of the herpetology of the Del-Mar-Va peninsula, very kindly supplied me with notes of Eastern Shore specimens collected at Willards, Wicomico County. On June 14, 1941, Mr. Conant with Amos Taylor, William Hice, and Richard Knox collected them hopping across sand roads at night after heavy rains. The first one was taken about 1 A. M., at a temperature of 72 degrees F., and the other was captured in the early evening (the next night, but the same date).

While perusing notes willed to the Natural History Society of Maryland by the late Dr. Howard A. Kelly, I came across an interesting reference to the spadefoot toad on the Eastern Shore. Toward the latter part of September of 1928 Dr. Kelly became interested in a news item relative to a "rain of frogs" on the Eastern Shore. On the 4th of October, W. S. Seymour, M. D. of Easton, Maryland sent the following letter to Dr. Kelly:

"I am today forwarding a few frogs - which happened to have been left in my cellar by my hired man. About two weeks ago there were suddenly found myriads of small frogs hopping about my lawn - and likewise on adjoining property of the distance of perhaps two city blocks. These frogs were practically all the same size and color; they were found only on the ground, pavements and state road. I saw none except as noted. I have made diligent inquiry, but no one appears to have noted them except on yards and roadways. There were doubtless millions of them. The State Road and pavements were black with them. There was a constant trail of them crushed in the traffic lines, and were scattered everywhere over lawns and gardens for possibly 5 or 6 days, when they gradually began to disappear until now there are none to be found where once they were quite dense west of the town. About 200 yds. is a low lying field and ditch, which

ordinarily has a small pond of water during the summer months, but on account of continued heavy rains this probably covered an area of 2 or 3 acres to a depth of two feet or more. This pond had numerous frogs. These small frogs were seen hopping about an adjacent lot for a day, before getting through to the state road running north and south through the town after an all night deluge of rain which filled this pond and adjacent lots. These frogs were found coming from direction of this pond, hopping everywhere in countless hordes and as many were crushed by the traffic their places were soon taken by many more, hopping constantly across the roadway. This as I mentioned continued for about 5 or 6 days. I am of the opinion that these frogs came from the aforementioned pond."

The few specimens sent to Dr. Kelly by Dr. Seymour were dispatched to the American Museum of Natural History. There the specimens from Easton, Maryland were identified by the late Dr. G. Kingsley Noble, the Curator of Herpetology, as young spadefoot toads.

Dr. Kelly notes that on the 4th of October, Dr. Samuel T. Earle told him of a visitation of toads, most of which were tiny and brown, in Queen Anne's County. This occurred two weeks later than the Talbot County exodus. He remarked that it appeared as if there were thousands of them, covering the road as thickly as a horde of grasshoppers during their swarming.

During the breeding season, this species often comes in great numbers to temporary pools where they breed at all hours, making a frightful uproar. At this time they are conspicuously abundant. It is possible that the prolific number of toads noticed in Talbot County may have been made up of recently transformed Fowler's toads, *Bufo woodhousii fowleri* and the spadefoot toad. Perhaps the conditions may have been favorable after the heavy rains for the transformation of the majority of the tadpoles, which had hatched from the thousands of eggs laid sometime before at a congregation of toads. Enemies, lack of sufficient food, and other conditions often kill off huge numbers of eggs and tadpoles even before transformation begins. Spadefoot toads usually disappear by instinctively burrowing in soft earth or sand a day or so after emerging from the tadpole stage; however, Fowler's toads hop about in search of food for a week or so before finally scattering enough through the surrounding locality.

The spadefoot toad should be looked for in Maryland in sandy regions with pines predominating. During July their appearance from their burrows is usually coincident with a long, warm, drizzling rain. They usually remain in the ponds for only one night, or two at most, accompanied with a loud continual chorus of shrill, ear-splitting cries from the male spadefoot toads.

Ed. note: Since the publication of this note in 1947 two other pertinent papers have been published: The Spadefoot Toad in Maryland by C. F. Reed (Herpetologica, 1956, 12:294-295) and New Records for the Eastern Spadefoot Toad in Maryland by C. J. Stine, R. S. Simmons and James A. Fowler (Herpetologica, 1956, 12:295-296). These will be reprinted in Volume 4, Number 3.

SOME HERPETOLOGICAL RECORDS FROM NASSAU COUNTY, LONG ISLAND

John M. Burnley

Little has been written since the early editions of Copeia (1913-18) concerning Long Island's herpetofauna. Many species are disappearing rapidly in Nassau County, which bears the brunt of the Island's rapidly mushrooming human population. The snakes, particularly, seem to be suffering from man's presence in the western-half of Long Island, where I now consider all species rare. It is an open question how much longer these creatures will survive, but certainly no one is very optimistic. Thus, it seems desirable to present the following preliminary notes concerning some of the indigenous species. All localities are on the North Shore of Long Island in eastern Nassau County, New York.

Amphibia

Plethodon cinereus cinereus - The Red-backed phase of *cinereus* is numerous in the moist North Shore woods. No "lead-backed" specimens have been encountered by the writer in this area. In the better localities, *cinereus* may be found under nearly every suitable log or piece of bark in the spring time, but becomes scarce or (occasionally) even impossible to secure during dry spells in the summer. Specimens have been taken near Beaver Lake in Mill Neck, and at Laurel Hollow on the hill above Church Pond (on the Nassau-Suffolk County line). Other collections were made at Cove Neck near Sagamore Hill, in Syosset north of Jericho Turnpike and in Muttontown SE of the Route 25A-106 junction. The specimen, catalogued No. 76973 in the American Museum of Natural History, was collected by the writer on 2 October 1966 at Mill Neck.

Eurycea bislineata bislineata - A common species locally, *bislineata* is a denizen of cold springs and small brooks where it hides under debris at the waterline. Kentuck Brook (Mill Neck-Locust Valley), an ideal habitat, is strewn with rocks, and seepages of spring-water enter the stream from both sides. Here, the salamanders are most often found under stones in the trickle of a spring near the main stream. Thus they are able to take advantage of the cold spring water, and at the same time may escape into the brook if danger threatens. I have found the water temperature of Kentuck Brook to vary from 38 degrees F. in January to 73 degrees F. during the summer. However, the spring water in the immediate vicinity was found during the same period to vary from a minimum of 41 degrees F. (although this is considerably below the average) to 56 degrees F., permitting *bislineata* to remain active throughout the year.

The damming of Kentuck to form two ponds upstream from the major colony seems to be responsible for the brook's rather uniform discharge under all weather conditions, the water being held for a considerable period of time. Without these ponds as "regulators," this stream would be very susceptible to flooding, as it is above these ponds. To what extent floods would affect the colony is somewhat difficult to evaluate, but judging from the stream's appearance above the ponds, it would probably be very destructive. Specimens numbered AMNH 72550-51 were collected here on 31 January 1964.

Near the source of another small brook, in Oyster Bay Cove, *bislineata* becomes abundant. No rocks are present, and the salamanders find shelter under logs which are in a constant trickle of cold water. On one winter trip no adults were found.

The springs on both sides of the stream were frozen, but larvae were taken in the brook itself. AMNH No. 75112 was collected here on 6 January 1965.

Rana sylvatica - A single Wood Frog has been recorded from a dirt road bordered by thick woods in East Norwich. The possibility exists that it was introduced.

Rana pipiens pipiens - On the night of 8 April 1963, the writer and Mr. Cornell Thompson collected three adult *pipiens* at an East Norwich pond. The species was not seen again until 20 September 1965, when a dozen or so adults were observed in a dried-up swamp near Greenvale. The Leopard Frog seems to be highly localized in Nassau County.

Rana palustris palustris - *Palustris* is rather abundant, especially in swamps and swampy meadows exposed to a maximum of sunlight. On 15 March 1964, two Pickerel Frogs were found in a dormant state beneath a rock in a small stream. This shelter near Kentuck Brook, Mill Neck, was shared with an adult *Eurycea bislineata bislineata*. Water temperature registered 48 degrees F.

Rana catesbeiana - The Bullfrog, though not particularly abundant, is very widely distributed and has been occasionally encountered at nearly all North Shore ponds. One medium-sized individual in a dormant state was found on 2 December 1964, beneath a large rock in a tributary of Kentuck Brook (in Locust Valley). The water temperature was found to be 50 degrees F.

Reptilia

Coluber constrictor constrictor - This species has been recorded as follows: Oyster Bay near Shore Road, sunning on railroad embankment; Laurel Hollow, top of hill on Rt. 25A near West Side School (DOR); Mill Neck, sunning on the railroad embankment near Beaver Lake; Muttontown near Rt. 106, snake attempted escape by climbing into bushes (caught by Mr. Peter DeRose); Mill Neck at Beaver Lake, a dead specimen (cause unknown) found on 5 April 1964.

Diadophis punctatus edwardsi - On 3 July 1963, a DOR adult of this species was seen at Cove Neck near Sagamore Hill.

Storeria occipitomaculata occipitomaculata - A DOR adult was seen on Rt. 25A, Laurel Hollow, near the Nassau-Suffolk County line on 28 September 1963.

Terrapene carolina carolina - The Eastern Box Turtle is fairly abundant, especially in overgrown areas near swamps. Specimens of *carolina* from the vicinity of Mill Neck attain a notably large size. Of a dozen individuals measured by the author five were found to have straight-line carapace measurements of six inches or more: 6.51" (165 mm) male, 6.41" (163 mm) sex undetermined, 6.34" (161 mm) male, 6.25" (159 mm) male, 6.0" (152 mm) female.

Clemmys guttata - A very uncommon species in Nassau Co., *guttata* appears to be making its last stand in one small swamp at Mill Neck. Four Spotted Turtles were found on 28 April 1963, in a small swamp near Lattingtown. Subsequent searching has yielded no additional specimens from that locality. The size of fifteen adults from the above stations is normal for the species:

eight males averaged 4.20" (107 mm) in carapace length, with extremes of 3.88" (99 mm) and 4.47" (114 mm); seven females averaged 4.10" (104 mm), with extremes of 3.56" (90 mm) and 4.34" (110 mm).

Guttata has been recorded at the Mill Neck colony only in the spring, my earliest date being 10 March 1965, and latest 20 May 1962. In 1963 copulation was observed on 20, 27 and 28 April.

Clemmys insculpta - On 29 September 1965, a DOR *insculpta* of medium size was seen on Rt. 25A in Laurel Hollow, 1/4 mile west of the Suffolk County line. Murphy (1916) offered no valid Wood Turtle records, and Conant (1958) excluded Long Island from the range. It is impossible to say whether this specimen was a release but the chances seem more than likely due to the rather extensive introduction of non-indigenous turtles on the Island.

Chrysemys picta picta - On 17 November 1965, a small intergrade Painted Turtle was found DOR near a pond south of Mill Neck. This *Chrysemys* was intermediate between *picta* and *marginata*. Its carapace scutes were staggered and the plastron had a rather small but well defined blotch.

Murphy (op. cit.) recorded *Chrysemys picta* as being very plentiful in streams and ponds, but failed to mention subspecies. Conant (op. cit.) did not include Long Island in the range of *marginata*. It seems probable that this specimen, like the *Clemmys insculpta* before mentioned, had been introduced. However, the possibility that either or both of the above is actually indigenous to Long Island should not be completely overlooked.

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1916. Long Island turtles. Copeia, No. 33, pp. 56-60.

110 Radcliff Drive, East Norwich, L. I., N. Y. 11732

Information to Accompany
Captured and Preserved Specimens

A short time ago one of our new members was told that the Spotted Salamander, *Ambystoma maculatum*, could be found in the Lake Roland area. Since he lived rather close to this area he asked exactly where this amphibian could be found. He explained that he had checked some of the data cards but found them sketchy, giving little more than the following information: 2 March 1953, *Ambystoma maculatum*, Lake Roland, Baltimore County, Maryland, and the name of the collector. Since the Lake Roland area is large (2 - 3 square miles) he realized that much time would be wasted if more specific information was not obtained.

The late Romeo J. Mansueti, Ph. D., a former curator of the Department of Herpetology, foresaw this problem and tried to remedy it. He designed a data card (both sides of which are reproduced below) that would enable future collectors to know what the conditions were when the specimen was taken, and exactly where it was collected. Only by filling out cards of this type will we be able to amass enough field data to be of significant value for future use. Collection data cards should be completely filled out at the time the specimen is taken - not back in the laboratory. The data card and the specimen container should be marked so that they match. When you return to the laboratory the data card may be recopied, if necessary. This will mean a little extra work on the part of the collector but it is necessary because physical conditions change and human memories fade. The data card should contain enough information so that future collectors may return to the exact location at which the original specimen was taken.

DEPARTMENT OF HERPETOLOGY
NATURAL HISTORY SOCIETY OF MARYLAND

Species: _____	(Front Of Card)
No.: _____ Collector: _____	
Locality: _____	
Altitude In Feet: _____ Date: _____ Sex: _____	
Condition: Poor, Fair, Good in Alcohol, Formalin, Dehydrated State	
Determined By: _____	Donated By: _____
Length Over All: _____	Tail Length: _____
Scale Formula: _____	Ventrals _____ Caudals _____
Snakes	
Costal Grooves: _____	Height: _____ Breadth: _____
Salamanders Turtles Turtles	
Color In Life: Dorsal _____	
Ventral _____	
Tail _____ Pattern: Spots: Ring: Stripes: Blotches:	

Head: _____
Limbs: _____
Etc.: _____
Weight In Grams: _____ In Pounds: _____ Age: _____

Species: _____ (Back
No.: _____ Time: _____ Temperature: _____ Humidity: _____ Of
Weather: Clear, Rainy, Cloudy, Partly Cloudy, Foggy, _____ Card)
Snow, Moist, Dry, _____
Exposure: N-E-S-W _____ Wind: _____ MPH
Soil: Rocky, Gravel, Sandy, Clay, Humus, Mud _____
Slope: Level, Slight, Moderate, Steep, Cliff, Bare, _____
Rocky, Wooded _____
General Area: Coastal, Piedmont, Mountain, Desert, _____
Jungle, Meadow, Forest, Bog, Partly Wooded, _____
Ravine, Slope, Ridge, Valley, Road, Building, _____
Glade, Cultivated Field, Farmland, Swamp, _____
Marsh, Pine Barren, Salt Marsh, Fresh Marsh, _____
Beach _____
Water Association: Transient Pond, Stationary Pond, _____
River, Stream, Creek, Spring, Puddle, Sea, _____
Lake, Clear, Muddy, Fresh, Brackish _____
Plant Association: _____
Remarks: _____

--Daniel J. Lyons, *Department of Photography, Natural History Society of Maryland,*
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R. G. TUCK, JR.
OCT 4 1968

BULLETIN OF THE

Maryland Herpetological Society



SEPTEMBER 1968

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The Cover: A typical Camouflage shot of *Ancistrodon c. mokeson*. Photo by Dr. R. S. Simmons.

Ed. note: Manuscripts being submitted for publication should be typewritten (double spaced) on good quality 8 1/2 by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by author. Reprints are available at \$.01 a page (\$.02 a page with photographs) and should be ordered when manuscripts are sent in.



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The Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland, Inc.

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A Survey of Albinism in Maryland Amphibians and Reptiles

The purpose of this report is to gather in one place all the known occurrences of albinism in Maryland amphibians and reptiles. This note includes both reported and unreported instances of albinism. Abbreviations used are as follow: HSH, Herbert S. Harris, Jr.; AMNH, The American Museum of Natural History, New York; USNM, United States National Museum, Washington, D. C.

*Ranidae**Rana catesbeiana* Shaw

Baltimore County, pond off Magnolia Avenue, near Silver Spring Road; September 1963. The author and Robert S. Simmons collected numerous tadpoles and recently transformed frogs at this locality after seeing an account in the Baltimore News Post. (AF151HSH, AF155HSH, AF191HSH).

Frederick County, "Lily Pons." Tadpoles have been collected repeatedly at this locality.

_____, Maryland Frog Farm; March 1939, AMNH 43685. An adult specimen was reported by Richard G. Zweifel, American Museum of Natural History, New York (Hensley, 1959).

Rana pipiens sphenocephala Cope

Prince Georges County, Patuxent Research Refuge at Laurel. Adult specimen (Hensley, 1959).

*Ambystomidae**Ambystoma maculatum* Shaw

Cecil County, an adult specimen collected in a pond below Conowingo Dam, by Lon Ellis.

Prince Georges County, Patuxent Research Refuge; collected by L. M. Llewellyn on 25 April 1957; adult specimen, USNM 139672 (Hensley, 1959).

Ambystoma jeffersonianum Green

Washington County, pond off Earnestville Road, near U. S. Rt. 40; September 1965; numerous larvae collected by the author, L. Richard Franz and Robert S. Simmons (Harris, 1967). AS371HSH, AS405HSH.

*Plethodontidae**Plethodon cinereus cinereus* Green

Baltimore County, Hartford Road and Gunpowder River; adult specimen collected 5 April 1936 by Frank Groves.



Fig. 1--A recently metamorphosed albino *Rana catesbeiana* from a pond off Magnolia Avenue, near Silver Spring Road, Baltimore County, Maryland.



Fig. 2--A recently transformed albinistic *Ambystoma jeffersonianum* from a pond off Earnestville Road, Washington County, Maryland.

*Colubridae**Elaphe obsoleta obsoleta* Say

Anne Arundel County, off. Marley Neck Road, near Solly. Specimen collected June 1964 and given to the Baltimore Zoo. It was a juvenile specimen basically whitish with pink eyes; melanin was present on a few scales and on the iris of the eye.

Prince Georges County, Silver Spring. An adult specimen given to the National Zoological Park by Mr. Frank A. Davis (Cooper, 1958).

Prince Georges County, near Upper Marlboro. An adult specimen (USNM 130299) taken 5 October 1951 (Cooper, 1958).

*Testudinidae**Chrysemys picta picta* Schneider

Prince Georges County, "Marlborough, Marlborough Branch, Maryland" in April 1942. A 29 mm specimen, USNM 116458 (Cooper, 1958).

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--Herbert S. Harris, Jr., *Department of Herpetology, Natural History Society of Maryland, 2643 N. Charles Street, Baltimore, Maryland 21218.*

A Copperhead from Garrett County, Maryland

Since the Northern Copperhead, *Ancistrodon contortrix mokeson*, appears to be uncommon in western Maryland, I believe that it would be of interest to report a specimen taken on the Alleghany Plateau on 18 August 1967 by Lea Franz and the author. The specimen, a female, was collected as it crossed the Savage River Road, 3.4 miles west of its junction with Rt. 135 at Bloomington, Garrett County, Maryland.

On the northwestern side of the road, there was a vertical rocky embankment which may serve as a basking site during late afternoon. The other side of the road consisted of a steep slope and the flood plain of the Savage River. The vegetation of the slope was composed of black oak (*Quercus* sp.), grape vine (*Vitis* sp.), sassafras (*Sassafras albidum*), and various composites.

Statistics: Total length 673 mm; body length 584 mm; tail length 89mm; ventrals 147; caudals 44 with the last 12 divided; anal entire; supralabials 7; infralabials 9; saddles 16 with 4 broken; saddles 4 to 5 scales wide at narrowest point.

--L. Richard Franz, *Parkville Senior High School, 2600 Putty Hill Road, Parkville, Maryland 21234.*

Notes on the Occurrence of three Reptiles in Morris County, New Jersey

Rossman and Gosner (1959) did not include the following three reptiles, *Sternotherus odoratus*, *Chrysemys picta picta*, or *Thamnophis sauritus sauritus* as having been recorded from the piedmont sections of Morris County, New Jersey. *Sternotherus odoratus* was also, not included as being recorded from the highlands section of Morris County. It is the purpose of this note to report specimens collected in these regions.

In September 1963, the author captured a small Stinkpot, *Sternotherus odoratus*, in the highlands section of Morris County. That specimen was found at Rockaway Township in the region of the Picatinny Arsenal. In the piedmont section of Morris County, the author has collected *odoratus* at Gillette, Passaic Township. The following chart shows the number of specimens collected on the respective dates:

<u>Date</u>	<u>Number</u>
6 May 1966	2
8 May 1966	3
17 May 1966	1
30 May 1966	3
4 June 1966	4
6 July 1966	4
15 August 1966	1
16 April 1967	2

The author has found the Eastern Painted Turtle, *Chrysemys picta picta*, in Gillette and Lincoln Park, New Jersey. During 1966 and 1967, Eastern Painted Turtles were captured by the author at the locality of Gillette. On 14 May 1966, the author collected a *picta* in the region of Lincoln Park. Gillette and Lincoln Park are both located in the piedmont section of Morris County.

At Gillette, Passaic Township, during 1966, the author captured a *Thamnophis sauritus sauritus* on 29 April and another specimen of 15 August. During the spring of 1967, the author collected a Ribbon Snake on 31 March at Lincoln Park and a specimen on 16 April at Gillette.

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--Frederick C. Schlauch, Post Office Box 103, Oceanside, Long Island, New York 11572.

Feeding habits of the Cuban Treefrog *Hyla Septentrionalis* in South Florida

Several writers have suggested or implied that *Hyla septentrionalis* feeds on other frogs, and that breeding individuals may devour other species at the breeding ponds; consequently, they concluded that these frogs would have an adverse effect on the native populations (Wright and Wright, 1949; Allen and Neill, 1953). For the last several years I have been attempting to gather sufficient data to confirm or deny this belief. Although in South Florida and the Keys, breeding congresses of these frogs are relatively common during the summer months, for most part I was unable to find this frog breeding simultaneously with other species. When other varieties were present, they were usually large species which would be unlikely to appear on this treefrog's menu (i. e. *Scaphiopus holbrooki*, *Bufo terrestris*, and *Bufo marinus*). During several consecutive days in early September 1965, Cuban Treefrogs were found breeding with *Hyla cinerea* in a temporarily inundated lake margin near Plantation, Broward Co. Florida. Male Green Treefrogs were calling from grasses and sedges a foot or more above the water; male *H. septentrionalis*, on the other hand, were distributed along the banks. The stomach contents of twenty individuals collected from this locality did not reveal any *cinerea*. Perhaps this can be accounted for by their selection of calling sites, but more probably adult *cinerea* are simply too large to be a preferred food item.

After three days of heavy rains, on 13 June 1967, I found *septentrionalis* calling from a road side ditch near Pompano Beach, Broward Co., Florida. *Scaphiopus holbrooki*, *Bufo terrestris*, *Bufo quercicus*, *Hyla squirella*, *Microhyla carolinensis* and *Limnaeodius ocularis* were breeding in this same ditch. With the exception of the last species, all the frogs were calling from positions on the banks or at the water's edge and considerable contact existed between the various species. Thirty male (41-59 mm) and sixteen female (54-86 mm) *Hyla septentrionalis* were collected and their stomach contents examined. Excluding small quantities of unidentifiable organic material, approximately 60% had empty stomachs, the remainder contained small numbers of *Diptera*, *Hymenoptera*, *Dermaptera*, and *Coleoptera*. No attempt was made to determine the relative percentage of food items, and the contents were simply listed. I should add that most of these insects were small in relation to the frogs apparent capacities. These findings substantiate those of Duellman and Schwartz (1958).

Although competition between this *Hyla* and other anurans may exist at other levels, the fact that the average size of the male (52 mm for fifty individuals) does not greatly exceed that of adult *Hyla cinerea* and the above findings lead me to believe that specimens in reproductive condition are likely to ignore other species of frogs as a source of food.

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--David S. Lee, *Department of Biology, Florida Southern College, Lakeland, Florida.*

The Timber Rattlesnake on Long Island

According to Engelhardt, Nichols, Latham and Murphy (1915), the Timber Rattlesnake, *Crotalus horridus horridus*, was at one time not uncommon in the swamps and pine barrens of Long Island. However, it is now apparently extinct in this portion of New York State.

The expansion of the Long Island Railroad in 1895 was a prime factor in the extirpation of the Timber Rattlesnake on Long Island, according to Engelhardt, Nichols, Latham and Murphy (1915). They stated that the snakes acquired the habits of sunning on the railroad embankments and of lying across the heated rails.

Murphy (1964) stated that the last known example of the Timber Rattlesnake from Long Island was killed by a train near Yaphank around 1900. Reilly (1955) stated that the last records of *horridus* from Long Island were two from Suffolk County in 1915. Seemingly, Murphy did not know about Reilly's note concerning the two 1915 records.

Weeks (1965) stated that Rattlesnakes were killed from time to time at the Southside Sportsmen's Club which is located in Islip Township. Dr. Reilly has informed the author via correspondence that the last *horridus* from Long Island was reportedly killed at the Southside Sportsmen's Club, and is now a mounted specimen in the New York State Museum. On the grounds of this sportsmen's club, there is a stream called "Rattlesnake Brook."

Engelhardt, Nichols, Latham and Murphy (1915) stated that according to Mr. A. H. Helme, Freeport was one of the last strongholds of the Timber Rattlesnake on Long Island.

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--Frederick C. Schlauch, *Post Office Box 103, Oceanside, Long Island, New York 11572.*

STRUCTURE, RELATIVE TOXICITY AND PHYSIOLOGICAL EFFECTS OF SNAKE VENOMS

Joseph A. Kilmon, Sr.

Snake venoms are complex substances and differ both generically and specifically. To analyze them chemically is extremely difficult. The most efficient way to approach this problem is to analyze them quantitatively in accordance with their physiological effects (Klauber, 1956, p. 757). These effects are usually classified in two general groups, hemotoxic and neurotoxic. The hemotoxins destroy the blood vessels and attack the red blood cells, releasing the contained hemoglobin. The resulting extravasation causes local swelling (edema) and hemorrhage. The neurotoxins attack the bulbar and ganglion cells of the nervous system involving respiratory activity. It must be noted that designating the venoms as hemotoxic or neurotoxic is a gross oversimplification. Neurotoxins can and often do have cardiotoxic or hemotoxic activity, or both. Hemotoxins, conversely, may contain the others. In this paper, I have referred to the principle activity.

Snake venoms are comprised chiefly of complex proteins (Klauber, 1956, p. 757) which include a vast variety of enzymes, each specific to a particular substrate in the organic complex of its prey. These enzymes include proteases, lecithinase, hyaluronidase, cholinesterase and lipases to mention a few. The action of just one of these enzymes, lecithinase, will characterize the complexity of venoms. Lecithinase catalyzes the decomposition of lecithin, which is found in the red blood cells and in the nerve tissues. Carried in the venom, this enzyme immediately acts on its substrate (lecithin), which is a compound of glycerol, stearic acid, oleic acid and phosphocholine. Cobra venom hemotoxin, (present in varying degrees in the venom of all cobras), is a type A lecithinase which splits this compound to liberate the oleic acid. The other product of the decomposition, lysolecithin, is the actual hemolytic agent. Thusly is produced a contingent hemolysis to aid absorption of the neurotoxic principle.

Venoms are composed of high molecular weight proteins. A purified toxic substance, crotoxin, of the Tropical Rattlesnake, *Crotalus durissus terrificus*, formulated by Slotta (1938, p. 204), was written $C_{1386}H_{2086}O_{470}N_{372}S_{41}$. This would be quite a molecule to assemble with a model kit. In support of this, through two-dimensional partition chromatography, it was determined that there are at least 18 different amino acids in *terrificus* venom.

Measuring the toxicity of venoms is also a rather difficult task. A generally accepted method is the mouse unit (MU), which is the minimum lethal dose (MLD) necessary to kill a mouse in twenty four hours. This is the ratio of a quantity of dried venom, in milligrams, to the body weight of the test animal, in kilograms. At the Americas Venom Laboratories, this method, using 20 gram Swiss white mice, is preferred. Using this method in a test of crotaline venoms, our lowest toxicity rating thus far, has been *Crotalus ruber ruber* with an MLD of 0.19. Our highest toxicity reading was with *C. d. terrificus* with an MLD of 0.0030. Since these results were obtained with only a few tests they cannot be construed as average, nor can the quality of the venom be attested, since it was obtained from a source other than our own specimens. Regardless of the degree of sophistication lacking in this methodology, the test does indicate the high toxicity of *terrificus* venom.

The physiological affects of venomous bites are as varied as are the individuals bitten. Involving the bite of a crotaline snake as an example, the sequence of events would generally be as follows:

1. Severe local pain due to the irritant action on the nerves and sensory endings.
2. Edema and erythema caused by local extravasation and lymph involvement.
3. Local necrosis.
4. General weakness and nausea.
5. Ecchymosis and hemorrhaging in intestinal tract, liver, spleen, kidneys, etc.
6. Paralysis; lesions of the small nerves of limbs caused by a degeneration of motor and sensory cells of the dorsal and lumbar spinal cord. Paralysis spreading to respiratory muscles as a result of damage to the cells of the medulla oblongata.
7. Damage to secretory cells of kidneys, resulting in albuminuria. Urine stained with blood.
8. Degeneration of liver - jaundice.
9. Weak pulse or heart failure.
10. Unconsciousness or death.

Other important factors in physical reaction to envenomation are such things as shock, anaphylaxis, panic and a lowering of bodily resistance.

A question often asked is "What is the most dangerous snake in the world?" In reality, this is an unanswerable question in the form stated. One criterion is simply: with which snakebite would the chance of survival be slimmest? It's true that the Indian Cobra, *Naja naja naja*, and the krait (pronounced 'Krite'), *Bungarus multicinctus*, collectively claim more lives in India and Burma (estimates 40,000 per annum) than any other species. This, however, is due to a large number of barefoot peasants bitten while tending fields. The Tiger Snake, *Notechis scutatus scutatus*, of Australia, is thought by many to have the most toxic venom of any snake. Intravenous LD₅₀ (Mg dried venom lethal to 50% of test animals within 24 hours) ratings are so small as to be barely discernable. Intraperitoneal injection have produced LD₅₀ ratings of less than 0.04. The Australian Death Adder, *Acanthophis antarcticus antarcticus*, a slightly larger snake, but with a less toxic venom, claims a higher percentage of victims. The Taipan, *Oxyuranus scutellatus scutellatus*, may claim an even higher percentage. Generally, the snakebite one would have the least chance of surviving is that of the King Cobra, *Ophiophagus hannah*. The mortality rate for this species possibly exceeds 90%.

It is quite apparent that venoms do man no good when administered by the snake. This does not mean, however, that venoms are of no use to man. Discoveries are being made in the fields of medicine and biochemistry that make venoms invaluable research materials and place them in heavy demand. Venoms have been found useful in the treatment of cancer, arthritis, hemophilia and cardiovascular diseases. They have become invaluable to the biochemist and enzymologist as a rich source of enzymes. For example, in the molecular linkage of the ribonucleotides, there is a phosphodiester link which is broken by venom phosphodiesterase. This enzyme is associated with another called 5'-nucleotidase. Both enzymes will cleave the phosphodiester linkage at certain points on the molecule. Thus venoms have found their importance in DNA (deoxyribonucleic acid) research.

In the field of medical research, venoms are coming into the spotlight as a probable replacement for the opiates. Cobra venom in controlled amounts, while producing the same pain killing effects as morphine, produces none of the adverse side effects of that narcotic, and more important, is not habit forming. At present, cobra venom (Cobroxin, Nyloxin; products of Hynson, Westcott & Dunning, Inc.) is used in the treatment of intractable pain.

In summary, one of man's age old scourges is rapidly, through venom research, becoming a blessing. The "Evil Demon" that has been the snake since the temptation in the Garden of Eden has elevated itself to become a necessary and beneficial source of pharmaceuticals.

Definition of Terms

Albuminuria - Presence of albumin in the urine.

Anaphylaxis - A condition of hypersensitivity to proteins and other substances in which exposure to or injection of the foreign matter results in attacks, sometimes so severe as to cause collapse and death.

Ecchymosis - An oozing of blood from a blood vessel into the tissues.

Edema - Excess of lymph fluid in the tissues, causing swelling.

Erythema - An abnormal redness of a portion of the skin, resulting from capillary congestion.

Extravasation - The infiltration of blood out of the blood vessel and into the tissues.

Hemolysis - Destruction of red blood cells.

Necrosis - The death or decay of body tissues.

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For additional information see: Bulletin of the Antivenin Institute of America (1929-1931); Wyeth Laboratories "Antivenin (Crotalidae) Polyvalent" (1961); AAAS Publication #44 "Venoms" (1956); Caras: Dangerous to Man, Chilton (1954); Russell: Venomous Animals and their Toxins (1963).

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THE SPADEFOOT TOAD IN MARYLAND*.--Recent collections of the Spadefoot toad, *Scaphiopus holbrooki holbrooki* Harlan, in Maryland and on the Delmarva Peninsula extend notably its known range in this region.

West of Chesapeake Bay, Mansueti (1947, Md. Jour. Nat. Hist. 17(1): 7-9, 12-14) cites Prince Georges and Calvert Counties. Cooper (1953, Md. Naturalist 23(3-4): 90-100) lists it from Anne Arundel County. It has also been collected in St. Marys and Charles Counties, as well as from the District of Columbia, Hay (1902, Proc. Biol. Soc. Wash. 15: 128), where a single record exists, even though recent collections do not include it there.

The following collections by the author and by Ralph Daffin are additions to the known distribution of this toad in Calvert and Anne Arundel Counties.

Calvert Co.: Cove Point (July 22, 1956; Reed 1081); Huntingtion (July 22, 1956; Reed 1073). *Anne Arundel Co.*: W. Owings (July 22, 1956; Reed 1077-80); Edgewater (July 21, 1956; Daffin 541); 1.5 mi. S. Rt. US 50, on Rt. 2, near Edgewater (July 21, 1956; Daffin 543); along Rt. US 50 at Rt. Md 2, near Annapolis (July 21, 1956; Daffin 544).

On the Delmarva Peninsula, Mansueti (1947, *l.c.*) and Cooper (1953, *l.c.*) gave Caroline, Talbot and Wicomico Counties. Conant (1945, Publ. Soc. Nat. Hist. Delaware, :3) listed it from New Castle, Kent and Sussex Counties, Delaware, Caroline and Wicomico Counties, Maryland and Accomac County, Virginia.

The following collections by the author are either new county records or additions to the known distribution of this toad on the Delmarva Peninsula.

MARYLAND: *Worcester Co.*: NE Pocomoke City in the Pocomoke State Forest (July 9, 1956; Reed 1103-1104); *Somerset Co.*: just N Pocomoke City (July 9, 1956; Reed 1126); *Caroline Co.*: Denton (McCauley; USNM-104406); near Tuckahoe River (Aug. 16, 1954; Reed 938-939); *Dorchester Co.*: region of Sharptown and Eldorado (Aug. 16, 1954; Reed). Denton and the Tuckahoe River localities are on the Choptank River drainage and Sharptown and Eldorado are on the Nanticoke River drainage.

DELAWARE: *Sussex Co.*: Bridgeville (Aug. 16, 1954; Reed 937), which is also on the Nanticoke River drainage.

VIRGINIA: *Accomac Co.*: woods in region of Oak Hall and New Church (July 9, 1956; Reed), which is south of the Pocomoke River drainage.

Therefore, for Maryland and the Delmarva Peninsula the range of the Eastern Spadefoot Toad is from New Castle County, Delaware, southward through Worcester County, Maryland, to Accomac County, Virginia and westward on the Peninsula to Somerset, Wicomico and Dorchester Counties and northward to Talbot and Caroline Counties. West of the Chesapeake Bay it ranges from southern Maryland in St. Marys and Charles Counties northward through Calvert and Prince Georges Counties to central Anne Arundel County and the District of Columbia. In Frederick County which is in the Piedmont and Blue Ridge regions there are several coastal recesses near Thurmont and Emmitsburg where it has been reported and collected. Other such coastal recesses occur in

*Contr. to the Herpetology of Md. and Delmarva: 3.

Montgomery and Baltimore Counties, especially in the regions of Sugar Loaf Mt. in the former county and along the Big Gunpowder Falls in the Glen Arm to Towson region in the latter county. These recesses are the only localities in Maryland where certain coastal plants are to be found off the Coastal Plain.

The general range for the Eastern Spadefoot Toad is given in the 6th edition of the Checklist of North American Amphibians and Reptiles by K. Schmidt (1953) as Massachusetts to Florida, west to Louisiana, eastern Texas and Arkansas, and northward in the midwest to West Virginia, southern Ohio, Indiana and Illinois. Wright & Wright, in Handbook of Frogs and Toads, map 7, page 124, indicate the distribution in our region as the Delmarva Peninsula and west of the Chesapeake Bay on the coastal plain in southern Maryland northward through the Piedmont Region of central Maryland into central Pennsylvania.--Clyde F. Reed, 10105 Harford Rd., Baltimore 34, Md.

NEW RECORDS FOR THE EASTERN SPADEFOOT TOAD IN MARYLAND.--Mansueti (Md., Jour. Nat. Hist. Soc. Md., Vol XVII, 1947, pp. 7-14) summarized the distribution of the eastern spadefoot toad, *Scaphiopus holbrookii holbrookii* Harlan in Maryland, listing it from Caroline, Talbot and Wicomico Counties, on the outer Coastal Plain and Calvert and Prince Georges Counties and the District of Columbia on the inner Coastal Plain. This note reports additional county records. The institutions and private collections with their catalogue abbreviations as used herein are as follows: Natural History Society of Maryland (NHSM); Museum of Natural History University of Illinois (MNHUI); Chesapeake Biological Laboratory (CBL); Robert S. Simmons (RSS); Charles J. Stine (CJS) and James A. Fowler (JAF).

1. NHSM A 1782, Briarcliff. A single specimen dug from a garden Apr. 20, 1947.
2. NHSM A 2003, Joyce Lane. An adult DOR, July 3, 1948, Mr. John Cooper.
3. NHSM (no number) and RSS 100, Priest Bridge. Eggs, tadpoles and toadlets collected in sand-gravel pits June 29, 1947, by Mr. Romeo Mansueti. Breeding colonies were found at this station during hurricane rains on Aug. 12, 1955, by Dr. Robert Simmons.
4. CBL (no number) and RSS 97, Benfield. Many DOR adults following a heavy rain June 23, 1950, by Mr. John Cooper and Mr. Joseph Gentile. A breeding colony found at this station in a transient roadside pond during hurricane rains on Aug. 12, 1955, by Dr. Robert Simmons.
5. RSS 98, Glen Burnie. A breeding colony found in a transient pond during hurricane rains on Aug. 12, 1955, by Dr. Robert Simmons.
6. CJS 310 and JAF 1386, Annapolis. Numerous recently transformed toadlets found on a lawn on Sept. 3, 1955, by Dr. William Bayliff.

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Charles County (southern Maryland on the inner Coastal Plain).

1. CBL (no number), Cedarville State Forest. A large number of tadpoles found in a sand-gravel pit pond and identified by mouth parts. Collected Aug. 24, 1955, by Mr. Romeo Mansueti.

Kent County (Del-Mar-Va peninsula on the outer Coastal Plain).

1. CJS 7-10 and RSS 19, Massey. A large breeding colony found in a cut-over corn field after a heavy rain April 1, 1952, by Dr. Robert Simmons and Dr. Charles Stine.

Somerset County (Del-Mar-Va peninsula on the outer Coastal Plain).

1. CJS 322, Tindlys Chapel. A juvenile and an adult collected on a hard-top road at night opposite a corn field on Aug. 28, 1956, by Mr. Howard Campbell. This record presently represents the southernmost station for this species in Maryland.

Worcester County (Del-Mar-Va peninsula on the outer Coastal Plain).

1. CJS 310 and JAF 1384, Bishop. Three adults found resting on sandy roads during a heavy rain July 17, 1956, by Dr. Charles Stine and Mr. James Fowler.

Frederick County (western Maryland in the Appalachian Highlands).

1. MNHUI 2797, High Knob Rd. between Frederick and the Catoctin Mts. An adult found on highway 2.5 miles N.W. Frederick, Sept. 13, 1948, during a rain by Mr. W. Leslie Burger and Mr. J. T. Burger.

2. RSS 101, Frederick. A single adult dug from a garden six inches below the surface Apr. 21, 1956, by Mr. Austin Rhoades. The last two records listed above are significant in that they are the first for Maryland west of the fall line and represent a range extension in Maryland for this species of 48 miles N.N.W. from the Glen Burnie, Anne Arundel County, station. However, that the species is thoroughly distributed throughout the state cannot be determined until the areas now appearing as large hiatuses are more intensely investigated.

We extend our thanks to Dr. Hobart Smith, Dr. William Bayliff, Mr. Romeo Mansueti, Mr. John Cooper, Mr. W. Leslie Burger and Mr. David Hardy for generously supplying information regarding some of these records.--Charles J. Stine, Robert S. Simmons and James A. Fowler. *Natural History Society of Maryland, Dept. of Herpetology, Baltimore, Maryland.*

Ed. note: Since the original publication of these two papers there has been no additional published information on *Scaphiophus* in Maryland.

Conservation - Please Keep it in Mind

The enthusiasm of young herpetologists often results in the collecting of large numbers of reptiles and amphibians. This indiscriminate collecting must be avoided. It not only helps to deplete an area of a particular species but may tip the balance of nature in such a way that it will never return to its former condition. This statement may be questioned by a few people but the following incident should erase all doubt.

Not long ago, there was a locale just north of Lake Roland where the long-tailed salamander *Eurycea l. longicauda* could be found in great numbers. This locale would always yield several large specimens whenever it was visited. These creatures were in such numbers that they could be taken with little or no effort. However, it only required three to five field trips, during which large numbers of these handsome creatures were taken, to reduce the population to almost zero. Although over a decade has past, the locale has never returned to its former condition. As a matter of fact, anyone who can collect a single specimen in this locale is considered quite fortunate.

The point is simply this: When the urge to collect more specimens that absolutely necessary is present - resist it. Future herpetologists will thank you and respect you for your fortitude and wisdom.

--Daniel J. Lyons, *Department of Photography, Natural History Society of Maryland, 2643 North Charles Street, Baltimore, Maryland 21218.*

What to do with Unwanted Specimens

What does the conservationally-minded young herpetologist do with specimens that have served their purpose? First, the specimens may be preserved. Second, they may be given to someone who has further use for them. Third, the specimens may be returned to their original locale. Under no circumstances, should they be released in areas where they are not native. The reason for this will be discussed later.

If a decision to preserve the specimens is made, proper collecting data should accompany them. (See Bull. Md. Herp. Soc., 4(2) for a thorough discussion on collecting data). In brief, the data should include the scientific name of the specimen, date, time, locale and name of collector. There should also be sufficient information so that other collectors may return to the exact spot where the original specimens were taken. A good preservation solution is: 1 part of full strength formaldehyde diluted with 10 parts of water. Inject the

specimens with this solution and store them in it.

If there is no need or desire to preserve the specimens they may be given to a fellow herpetologist who has further use for them. Before specimens are given away, the recipient should be given specific instructions as to their care and feeding. The specimens should be kept in the same environment and given the same food as did their former owner. A sudden change from the familiar to the unfamiliar can prove fatal, especially with reptiles and amphibians.

Returning specimens to their original locale is another way of disposing of them. This is by far the most humane thing to do but it can be costly and time-consuming. Still, many people do it, especially when large specimens are involved.

Many times, young herpetologists are tempted to release their catch in "the backyard" after the novelty of ownership has worn off. When reptiles and amphibians are released in a foreign locale they will probably die because of the lack of a natural environment. Also, specimens that are introduced to a foreign habitat may disrupt the local balance of nature. This is not likely to happen but it is possible. Fish can ruin a salamander breeding pond, and turtles can ruin both.

Another reason that specimens, foreign to a locale should not be released in it, is that their recapture can result in confusion and misunderstanding. Just because the carpenter frog *Rana virgatipes* could be released and recaptured in the Baltimore area does not mean that the second collector has discovered a significant range extension. If the released specimens should establish themselves, they are called ferals, that is, animals found in a particular locale but not native to it. Should breeding between introduced and native herps occur, the problem is compounded and results not only in temporary confusion in professional circles but permanent misunderstanding among amateurs.

The next time herpetological specimens are to be disposed of, please do it in one of three ways: (1) preserve it; (2) give it away; or (3) return it to its original locale. Your cooperation will be much appreciated by today's and tomorrow's serious herpetologists.

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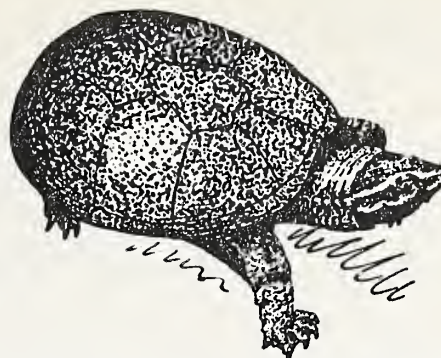
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AN ANNOTATED LIST OF THE SALIENTIANS OF SUFFOLK COUNTY,
LONG ISLAND, NEW YORK

Frederick C. Schlauch & John M. Burnley

Schaphiopus holbrooki holbrooki- Mr. Roy Latham informed Schlauch that Eastern Spadefoot Toads have been found at Calverton, Riverhead, Bridgehampton, Sag Harbor and East Hampton. He also stated that a specimen was found at Orient on 8 July 1948. Tadpoles of *holbrooki* were reportedly found at Oakdale and Speonk (Overton, 1914a). Overton (1914a) reported finding *holbrooki* breeding at Patchogue during April in 1912, 1913 and 1914. According to Overton (1915), large numbers of *holbrooki* were found breeding at Patchogue, Coram, Middle Island and Yaphank on the evening of 4 August 1915.

Bufo woodhousei fowleri - The Fowler's Toad is generally distributed throughout Suffolk County. During a rain on 1 October 1966, Burnley collected a *fowleri* (AMNH 76976) in the region of Tarkill Pond at Brookhaven Township. A brick red colored toadlet was found at Yaphank on 26 August 1967. On 3 May 1967, Schlauch heard *fowleri* calling at Smithtown. During the evening of 30 May 1967, Schlauch heard *fowleri* calling at Sayville, Blue Point and East Patchogue. Overton (1914a) reported that large numbers of *fowleri* were found migrating across a region of dry salt meadow toward some open pools in southern Patchogue on the evening of 28 April 1911. Overton stated that no such migration occurred during the years of 1912, 1913 and 1914.

Acris crepitans crepitans - Mr. Roy Latham reported that the Northern Cricket Frog had always been rare throughout eastern Long Island. However, Mr. Latham stated that he had recorded the *crepitans* from Manorville to Riverhead, in addition to the regions of Sag Harbor and Greenport.

Hyla crucifer crucifer- The Northern Spring Peeper ranges throughout most of Suffolk County. During Spring 1967, Schlauch heard *crucifer* calling at the regions of Cold Spring Harbor, Smithtown, Blue Point, East Patchogue, Manorville and Calverton. Overton (1914) stated that he heard two Spring Peepers calling at Brookhaven on 30 January 1914. Burnley heard *crucifer* calling at Hauppauge during the daylight hours of 10 April 1965.

Hyla versicolor versicolor - The collection of the American Museum of Natural History includes specimens of the Eastern Gray Treefrog from Cold Spring Harbor (AMNH 52371), Huntington (AMNH 69412-13), Miller Place (AMNH 41308), Middle Island (AMNH 18675 & AMNH 18832) and Patchogue (AMNH 6622). Mr. Roy Latham reported that *versicolor* was present throughout eastern Long Island. Dr. Robert C. Murphy has informed the authors that a general spraying of DDT in 1957 produced an adverse effect on the populations of the Eastern Gray Treefrog. Overton (1914a) stated that a *versicolor* was heard at Patchogue on 3 May 1913.

Rana catesbeiana - The Bullfrog is presently distributed throughout most of Suffolk County. Overton (1914a) reported Wading River as the only region where he found this species. The authors have found *catesbeiana* in the Peconic River System. On 12 August 1967, the authors collected some transforming specimens at Deep Pond, Riverhead Township. Three of these young *catesbeiana* are now labeled AMNH 78385-87.

Rana clamitans melanota - *Melanota* is probably the most common variety of frog in Suffolk County. On 4 October 1966, Burnley found Green Frogs in the region of Montauk Point. Schlauch heard Green Frogs calling at Blue Point and East Patchogue on the night of 30 May 1967. Both authors heard *melanota* calling at Calverton on 20 August 1967. Some additional specimens were heard calling in the region of Carmans River on 26 August 1967. Sanwald (1916) reported that a *melanota* was found at Patchogue on 18 December 1915.

Rana palustris - On 30 Duly 1964, John M. Burnley found a *palustris* near Church Pond, Cold Spring Harbor. At Calverton, Schlauch captured several Pickerel Frogs on 3 September 1966 and a single specimen (AMNH 78394) on 20 August 1967. Schlauch also heard Pickerel Frogs calling at Smittown on 3 May 1967 and at East Patchogue on 30 May 1967.

Rana pipiens pipiens - Mr. Roy Latham reported that the Northern Leopard Frog was formerly abundant throughout eastern Long Island. According to Mr. Latham, mosquito control work had an adverse effect on the populations of *Rana pipiens pipiens*. The Leopard Frog has been reported to be very common on the salt marshes of Great South Beach (Overton, 1914a). Overton (1915) stated that individuals were heard calling at the salt marshes near the Forge Life Saving Station on the afternoon of 12 September 1915.

Rana sylvatica sylvatica - Most of the Suffolk County specimens of *sylvatica* in the collection of the American Museum of Natural History are from the vicinity of the terminal moraine in the northern section of the county. Mr. Roy Latham mentioned that Wood Frogs were formerly abundant in a wooded swampy vicinity of Greenport. Overton (1914a) reported that *sylvatica* appeared in a pool located in a woods near Patchogue on 16 March 1913, and remained for about a week.

Acknowledgements

The authors wish to state their appreciation for information given to Frederick C. Schlauch via correspondence by Mr. Roy Latham and Dr. Robert C. Murphy. Thanks are also due to Dr. Richard G. Zweifel for permitting the writers to examine data at the American Museum of Natural History.

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OBSERVATIONS ON HYBRID *HYLA GRATIOSA* X *CINEREA* IN CENTRAL FLORIDA

David S. Lee

After several consecutive days of heavy spring rains, the night air was filled with the deafening chorus of breeding anurans. On the evening of April 7, 1963, during a short pause between the torrents, I wallowed into the field to examine the spectacle first hand. In a small cypress pond 6.5 miles north of Lakeland, Polk County, Florida, I collected *Hyla gratiosa*, *H. cinerea*, *H. femoralis*, *H. squirella*, *Bufo quercicus*, *B. terrestris*, *Acris gryllus*, *Gastrophryne carolinensis*, *Rana grylio*, *R. pipiens*, *Scaphiopus holbrooki*, *Limnaeodius ocularis*, and *Pseudacris nigrita*. All but the latter three species appeared to be actively breeding at that time. This large concentration of frogs produced a bedlam of sounds, through which could be distinguished the unique call of a single male. When this sound was traced it was found to be produced by a large *Hyla* calling from a dense clump of reeds. The frog itself was positioned about 18 inches above the surface of the pond. As best as I can recall the voice was similar in character to, but slightly higher pitched, than that of a typical *Hyla gratiosa*.

The following morning the *Hyla* was critically examined. Because of the following combination of characteristics, I have presumed that this frog represents a hybrid *Hyla gratiosa* x *cinerea*. The shape and size (snout-vent length 63mm) was that of a large *H. gratiosa*, but the shin was smooth like that of *H. cinerea*. The stripe, which is so prominent in *H. cinerea*, was sharply defined, starting on the upper jaw, continuing down the side and terminating in the groin. The dorsum

varied from green to brown, and gold flecking was present. The profuse, round, dark markings usually associated with *H. gratiosa* were absent. On the venter the throat was lemon yellow and the abdomen white, while the lower jaw was unmarked greenish white. The upper surface of the hind foot was covered with "lichen-like" white blotches. (Fig. 1)



Fig. 1--Hybrid *Hyla* collected 6.5 mi. N Lakeland, Polk County, Florida, April 7, 1963.

Hybrids between *Hyla gratiosa* and *Hyla cinerea* have already been described in literature. Bogert (1960) recorded their general appearance and a call spectogram. His single specimen was taken from a breeding congress of *Hyla gratiosa* in July 1957, near Hecona, Highlands County, Florida. He noted that its calling habits were identical to *H. gratiosa*, although it resembled *H. cinerea* in appearance. The size as well as the voice of the specimen was intermediate between the two species. Mecham (1960) described a large population of *Hyla* in which hybridization had occurred between these two species. In this area (5 mi. N. Auburn, Alabama) he noted that the artificial nature of the breeding ponds was the cause for a breakdown of the reproductive barriers.

Since my observations do not directly compare to these two previous accounts, I consider the following remarks as noteworthy. First,

although this single specimen presents an unjustified generalization of hybrid breeding behavior, its chosen calling site nevertheless was that of a typical male *H. cinerea*, and quite unlike that of *H. gratiosa* which calls from a floating position. Second, the size was not intermediate between the two species. In fact, it was considerably larger than any *Hyla gratiosa* I have collected in the area, although it does fall within the range of this species. Third, there was no alteration to the breeding ponds that would cause a breakdown in the natural isolating mechanisms.

I revisited this same pond on numerous occasions, but evidence of additional hybrids was lacking. However, I have since had the opportunity to examine several *Hylas* which were brought into the college. I would also classify them as hybrids between these same two species. In many instances collection data was not available, but it can be assumed that these frogs came from within a 15 mile radius of Lakeland. Likewise, I have collected several individuals which possesses characteristics of both *H. gratiosa* and *H. cinerea*. Many of these presumed hybrids had obtained a size that would suggest to me the presence of hybrid vigor, but this is, of course, purely conjecture. It would be necessary to obtain a larger sample to verify this belief. Nevertheless, I can conclude that natural hybridization between *Hyla gratiosa* and *Hyla cinerea* probably occurs with moderate frequency in nature.

I am indebted to John B. Funderburg for advice in preparing this note, as well as for his assistance in the field, and to Robert S. Simmons for the time and patience necessary to photograph the specimen.

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- Department of Biology, Florida Southern College, Lakeland, Florida.
Present Address: Towson, Maryland

ALBINISM IN THE GLOSSY SNAKE, *ARIZONA ELEGANS* KENNICOTT

Hensley (1959, Publ. Mus. St. Univ., Biol. Ser. 1 (4)) reported no instances of albinism in the Glossy Snake, *Arizona elegans* Kennicott. A subsequent record of an albino hatchling was published in the Philadelphia Herpetological Society Bulletin (1964, 12 (1-4):9) and is the only instance of albinism in *Arizona* known to the authors.

In June 1965, two high school students collected an albino specimen of *Arizona elegans* (Fig. 1) while driving through the San Felipe Valley of Anza-Borrego State Park, San Diego County, California. The San Felipe Valley is the region that San Diego Highway S-2 traverses

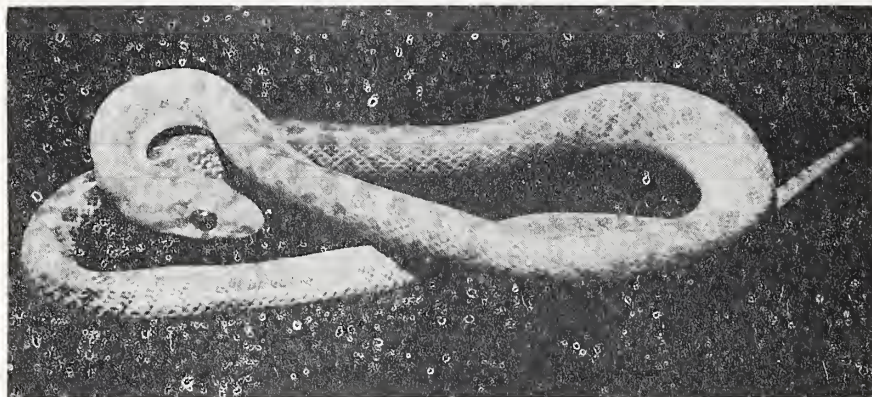


Fig. 1.-An albino *Arizona elegans* Kennicott, from the San Felipe Valley, Anza-Borrego State Park, San Diego County, California, RS618HSH.

between "Scissor's Crossing" with California Highway 78 at the western edge of the Borrego State Park, and a small town to the north called Hot Springs.

The specimen is a juvenile female, measuring 230 mm in snout-vent length and 32 mm in tail length. The color in life was pinkish-white, with brownish-pink indications of pattern. The eyes were pink. The specimen, number RS618HSH, is in the senior author's collection.

Normally pigmented individuals collected at this locality have exhibited characteristics of both *Arizona elegans occidentalis* and *Arizona elegans eburnata*. This area appears to be one of intergradation between these two subspecies.

—Herbert S. Harris, Jr. and Robert S. Simmons, *Department of Herpetology, Natural History Society of Maryland, Inc., 2643 N. Charles Street, Baltimore, Maryland 21218.*

ABNORMAL COLORATION IN *THAMNOPHIS SIRTALIS SIRTALIS* FROM THE ALLEGHENY PLATEAU OF MARYLAND

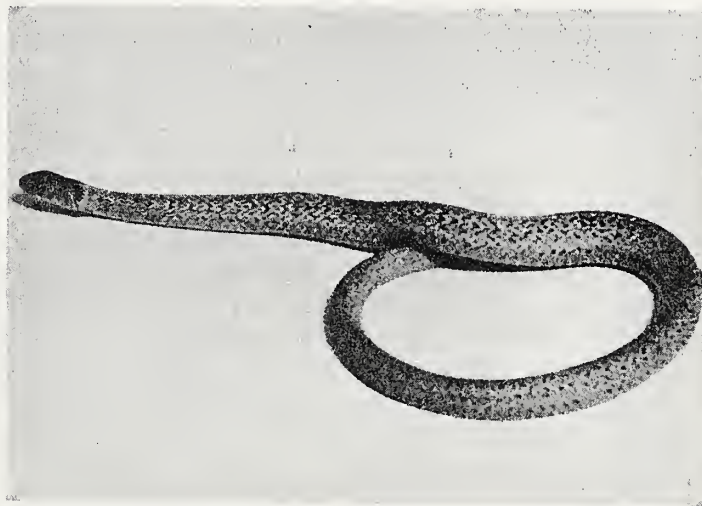


Fig. 1

On 23 May 1962, a female *Thamnophis sirtalis sirtalis* (Fig. 1), exhibiting abnormal pattern and coloration, was collected along a rail road track in the town of Frostburg, Allegany County, Maryland. The body coloration was light greenish-yellow, with some black flecks scattered through out. There were no distinct lateral or mid-dorsal stripes, and no checkering or spotting. No dorsal body pattern was evident. The head was very much darker in color and this coloration extended for one half-inch behind the parietals. The venter was light gray with almost no dark pigment. The scalation was normal with 19-19-17 scale rows, 138 ventrals and 58 subcaudals. Total length of the snake was 508 mm. The length of the tail was 101 mm, being approximately 1/5 of the total length. Within the last several years, many typical

Thamnophis were taken from this immediate area while only three abnormal specimens have been seen.

—Richard Franz, *Parkville Senior High School, 2600 Putty Hill Road, Baltimore, Maryland, 21234.*

EARLY APPEARANCE OF THE EASTERN GARTER SNAKE,
THAMNOPHIS SIRTALIS SIRTALIS , IN MARYLAND

On 21 January 1968 an adult specimen of *Thamnophis sirtalis sirtalis* was collected along a small flooded stream on a farm near Mt. Carmel Road, northern Baltimore County, Maryland. The specimen was found sunning itself on a small grass island surrounded by the swift current of a newly swollen stream. Since the Garter Snake had mud embedded between the scales, it is possible that the snake had been washed out of a hibernation site located along the now submerged cut bank of the stream. A high water level resulted from a sudden rise in temperature, which caused the deep snow cover to disappear rapidly. On this and the preceding day the temperature reached the mid fifties, but earlier, the temperature remained below freezing for several weeks.

—Richard Franz, *Parkville Senior High School, 2600 Putty Hill Road, Baltimore, Maryland, 21234.*

SPRINGS AS HIBERNATION SITES FOR MARYLAND'S HERPETOFAUNA

It appears that many of Maryland's springs form not only convenient, but also ideal hibernation sites. The uniform temperature of spring water prohibits freezing weather from producing sharp temperature fluctuation in these micro-environments. At the same time, the temperature of the water is low enough to allow the normal change in metabolic rates, which are essential for the winter survival of aquatic amphibians and reptiles. Many non-aquatic species also take advantage of spring hibernation sites, and it appears that such sites are preferred due to the nearly uniform temperature of the surrounding soil and rocks.

I believe a few examples will illustrate this point. In April 1961 on five consecutive days near the end of the month, I observed 15 *Coluber constrictor*, 5 *Lampropeltis doliata*, 2 *Elaphe obsoleta*, 12 *Diadophis punctatus*, 1 *Heterodon platyrhinos*, 10 *Rana clamitans*, 8 *Rana pipiens*, 27 *Desmognathus fuscus* (adults and larvae), 5 *Eurycea bislineata*, 5 *Eurycea longicauda*, 5 *Pseudotriton ruber* larvae, and 2 *Plethodon cinereus*, in and above a small spring near Belhaven Farm, Baltimore County, Maryland. The spring consisted of one 4 x 4 foot water tank below ground level and a flagstone wall about 3 feet in height built above the spring proper to retain the soil.

On 18 and 23 March 1962, while repairing a different spring in the same general area, I found 8 *Elaphe obsoleta*, 6 *Lampropeltis doliata*, 4 *Diadophis punctatus*, 4 *Agkistrodon contortrix* and 1 *Natrix sipedon*. The snakes were from 12 to 30 inches below the ground in various pockets behind a similar stone retaining wall. The four ringneck snakes were found together but the remaining species were scattered throughout the wall in small heterogenous groups.

Several major denning sites for copperheads in northern Baltimore County are likewise positioned near springs. The warm water, in fact, produces such a desirable situation, that the rocky outcroppings near many spring-dens fail to have the southern exposure, which is characteristic of typical snake dens.

On 30 March 1968, I found 4 *Clemmys guttata* buried in loose, bubbling silt on the bottom of Ashland Creek, Cockeysville, Baltimore County, Maryland. Although this spring was small, temperatures in the surrounding silt were 5 to 8 degrees warmer than the creek water. This difference in temperature would of course be more marked in earlier months.

Several spring houses near Timonium, Baltimore County, Maryland supported extremely large colonies of *Eurycea longicauda* and *Pseudotriton ruber*. Adults of both species appeared in numbers in the Spring and Fall, and although this probably represented some type of migration, the advantage of spending winters in the springs and the even deeper underground aquifers must be considered.

I believe that knowledge of spring hibernation sites will enable field workers to focus their collecting and enable us to gain a more comprehensive knowledge of the distribution and ecology of Maryland's herpetofauna. Systematic sampling of these dens will give us a better understanding of seasonal migrations and natural population fluctuations. These dens could also be the centers for marking large series of specimens which in turn could give us much needed information on the growth and territory of individuals.

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ADDITIONAL RECORDS FOR *CLEMMYS MUHLENBERGII* FROM MARYLAND

John E. Cooper

McCauley and Mansueti (1943, p. 197) secured the first definite record for *Clemmys muhlenbergii* in Maryland. This record was based on a specimen collected 1 mile north of Grave Run Mills, Baltimore County, in August, 1941 by Joseph Bures and Conrad Kenny. Previously, Brady (1937, P. 139) reported this turtle between the C. & O. Canal and the Potomac River in Montgomery County but without reference to a definite specimen. More recently two additional specimens of this rare turtle have been collected in Maryland, both of them from the floodplain of the Susquehanna River below the Conowingo Dam in Cecil County. The occurrence of *muhlenbergii* in this region was predicted by McCauley (1945, p. 157) and was to be expected since the Susquehanna River flows through identical adjacent sections of the same drainage system in southeastern Pennsylvania where the turtle is rather common. Fowler (1915) and Conant (1945, p. 8), who have collected rather extensively in the region, do not record the species from Cecil County.

The first of the new specimens (NHSM-R858) was found on April 6, 1947 burrowing into the moist humus on the edge of a small, intermittent, vegetation-choked pond. It was an old male, the carapace of which had the following dimensions: length - 91mm, width - 61mm, height - 35mm. The pond was on the edge of a large, meadow type field, bordering a deciduous woods.

The second specimen was collected on April 27, 1947 by John E. Norman. The following field notes were made at the time of its capture. The turtle, a female, was first seen on the bank, a few

inches from the water, of one of the many small ponds on the east side of the Susquehanna River just below the Conowingo Dam. It moved swiftly on land but did not seem to be able to move very fast in water when it swam about two feet from the bank and hid in leaves on the bottom in approximately twelve inches of water. At the time of its capture, just after midday, the temperature was 16° C. The measurements for this specimen were as follows: carapace length - 82mm, carapace width - 62mm, height - 32 mm.

The section of the flood plain where these turtles were collected is a sphagnaceous swamp bounded on the north by a small cattail marsh almost at the foot of the Dam, on the south by a large, meadow-type field which separates it from a wooded section along Octorora Creek, on the west by the beach of the Susquehanna River, and on the east by a culvert, approximately 25 feet wide, and a low hill which separates it from the road. The bottom of the pools and streams in this area are covered with leaves and debris. *Clemmys guttata*, *Chrysemys p. picta*, *Sternotherus o. odoratus*, *Cheyladra s. serpentina*, *Terrapene c. carolina*, *Clemmys insculpta*, *Elaphe o. obsoleta*, *Natrix s. sipedon*, *Thamnophis s. sauritus*, *Rana clamitans*, *Rana catesbeiana*, *Rana palustris*, *Hyla c. crucifer*, *Acris crepitans*, *Bufo w. fowleri*, *Hemidactylium scutatum*, *Plethodon c. cinereus*, and *Ambystoma maculatum* are abundant in the region. *Coluber c. constrictor* has also been observed, as well as a larval *Pseudotriton r. ruber* and two adult female *Triturus v. viridescens*.

Subsequent field trips to the Conowingo region during the spring and early summer months have revealed no further specimens of *muhlenbergii* with the exception of a shell found by Romeo Mansueti and identified as this species. However, Muhlenberg's turtle has apparently established itself in Cecil County, an assumption, the veracity of which would be enhanced, by the discovery of young specimens or eggs. Its occurrence in adjacent Harford County should also be anticipated.

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Additions to the Distribution Survey:
Maryland and the District of Columbia - II

Since the publication of the "Distributional Survey: Maryland and the District of Columbia" (Bull. Md. Herp. Soc. 1(1): 3-14) and the "Additions to the Distributional Survey: Maryland and the District of Columbia - I" (Bull. Md. Herp. Soc. 2:(4): 24-26) the following new county records have been received:

Caroline County -

- Elaphe g. guttata* - Nr. Marshyhope Creek in the vicinity of Federalsburg. No date, M.L. Stapleton. (A.M.N.H. 70727).
- Elaphe g. guttata* - Federalsburg. 21 July 1950. M.L. Stapleton (A.M.N.H. 73643).
- Lampropeltis g. getulus* - 2 mi. S.E. Federalsburg. 1 June 1950. M. L. Stapleton (A.M.N.H. 70732).

Ed. note -- Above Caroline County records were brought to the author's attention by Mr. Frederick C. Schlauch.

Frederick County -

- Pseudemys rubriventris* - An adult male, brought into Jungleland Serpenterium at Thurmont, Md. on 15 July 1968 from Creagerstown, Md. The turtle was found on the driveway of the home of Mr. Russell Fisher, by his daughters.

Sternotherus odoratus - Collected on M.H.S. field trip 17 August 1968 at Point of Rocks, by William N. Shirey.

Kent County -

- Pseudemys rubriventris* - See Bull. Md. Herp. Soc. 3(4): 103.

Montgomery County -

Clemmys insculpta - Originally reported by McCauley (1945), evidently missed in "Original Distributional Survey."

The "Additions to the Distributional Survey: Maryland and the District of Columbia" will be published at the end of each year as warranted. An up-to-date survey is planned for the December 1969 issue.

Note: Please send all new county or state records to:

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—Herbert S. Harris, Jr., Curator Dept. Herpetology, Natural History Society of Maryland, Inc., 2643 North Charles Street, Baltimore, Maryland 21218.

THE USE OF SALAMANDERS AS FISHING BAIT

E. Leslie Knight and David S. Lee

North American salamanders, because of their lack of economic value to man, have been ignored by laymen. This unique situation has allowed them to escape the purges that face much of our native wildlife, leaving them to cope with only increasing destruction and pollution of their habitats. It now appears that the economic importance of these animals has become established and the future of many species will undoubtedly be affected.

During the last several years we have become aware of the growing use of salamanders as fishing bait. Visits to commercial bait dealers have revealed that in several sections of the eastern United States large quantities of salamanders are sold annually. Many species and races of salamanders are thus exploited. In numerous bait shops in the Appalachian Region we have purchased the following salamanders: *Desmognathus monticola*, *D. planiceps*, *D. quadramaculatus*, *Leurognathus marmoratus* sub-sps., *Desmognathus fuscus fuscus*, *D. o. ochrophaeus*, *D. o. carolinensis*, *Eurycea bislineata cirrigera*, *Gyrinophilus porphyriticus porphyriticus*, *G. p. danieli*, *G. p. dunni*, *Pseudotriton montanus* sub-sps.,

P. ruber ruber, *P. r. schencki*. It seems that while in most areas only local species are used, many of these varieties appear in bait stores hundreds of miles outside of their recorded ranges. In regions where large populations of "spring lizards" are scarce, they are shipped in by professional suppliers. Present market prices range from \$1.00 to \$3.50 per dozen, depending on the locality, season, and size of the salamanders.

In Florida, salamanders are also a popular bait item and we have found *Pseudobranchius striatus* with its various races, *Siren intermedia*, and young *S. lacertina* and *Amphiuma means* for sale in several bait shops.

We have called the readers' attention to the bait industry's use of salamanders for three reasons. First, visiting bait shops is a profitable, and easy method of acquiring a representative collection of salamanders, and often the dealer will be able to identify the general locality from which the salamanders were collected. Second, we fear that the use of these amphibians as fishing bait will have a detrimental effect on local populations. In view of the fact that many varieties are geographically and ecologically confined to small areas, it is possible that some races will be completely exterminated in the next several years. Precise taxonomic relationships, in many instances, are poorly understood and the ecological and evolutionary positions of many groups have not yet been investigated. Third and most important, these salamanders sold for fishing bait are introduced into new areas. This is accomplished by the fisherman who probably tosses the "left over" bait into the stream or river. When this happens outside of normal ranges for the species or sub-species, introduction of a competitive species may result. This also produces many ecological and taxonomic problems.

The number of salamanders required by bait dealers is astounding. It is not uncommon to see large potato chip cans, metal wash tubs or other equivalent containers filled with salamanders to a depth of several inches. During the summer and fall months a single bait shop often has a thousand or more specimens on hand. According to the dealers, they sell these salamanders almost as soon as they are received. Indeed they must, for it is difficult to imagine that salamanders could survive under these conditions for more than several days. Collectors and wholesale suppliers inform us that they have little difficulty in selling whatever they can catch, and in fact, can seldom meet the demands of the dealers. It should be noted that it is not unusual for a collector to capture several hundred salamanders in a single evening. Nevertheless, because of the seasonal aspect of this business, few collectors presently consider this a full-time occupation, and they usually rely on salamander collecting for a supplementary income.

During the next few years the role of salamanders in the bait industry needs to be placed under close scrutiny. If this business is as widespread as we fear it may be, and if the value placed on

"spring lizards" continues to increase, strict control will have to be placed on commercial collecting and shipping. Probably the only solution to this problem will be an eventual restriction placed on the fishermen themselves prohibiting the use of these animals as a legal bait.

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Additional Albino Amphibians and Reptiles from Maryland

Since the publication of the survey on albinism (Harris, 1968), two additional Maryland records have been received.



Fig.1 Albino *Plethodon cinereus* (#68-524)

*Plethodontidae**Plethodon cinereus cinereus* Green

Prince George's County, College Park. Dug from a garden by Frank Wettle October 1968. Presently in the collection of Dr. Richard Highton #68-524. (Fig. 1)

*Colubridae**Carphophis amoenus amoenus* Say

Montgomery County, Damascus. 1959 by E. R. Okleson (USNM 145372)
Died at National Zoological Park (18014NZP) on 11 December 1959.

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BATTLE CREEK CYPRESS SWAMP

Kent Wells

Less than two hours drive from Washington or Baltimore, two links in the great chain of densely populated cities known as megalopolis, there is a small area of uninhabited wilderness called Battle Creek Cypress Swamp. Battle Creek Swamp is located on Route 506 in Calvert County, Maryland, about two miles south of Prince Frederick, on a tributary of the Patuxent River. It is the northernmost cypress swamp on the East Coast. The only other stand of cypress of any significant size in Maryland is the Pocomoke River swamp on the Eastern Shore, and the nearest large cypress swamp is the Dismal Swamp on the Virginia-North Carolina border. It is the purpose of this article to discuss the interesting, and in some ways unique natural history and herpetology of Battle Creek Swamp.

There is nothing new about the presence of bald cypress in the Maryland area. Mansueti (1955) believes that it was widespread in prehistoric times, before rising seas from melting glaciers covered

all of Calvert County. Washington, D. C. is actually resting on the remains of a 100,000 year old Pleistocene swamp from which fossil cypress has been excavated. (In fact, I was present in early August 1967 when workmen unearthed two pieces of petrified wood while drilling inside one of the courtyards of the Smithsonian Institution's Natural History Museum in Washington.) Mansueti indicates that the disappearance of cypress from other sections of Maryland may have been due to drainage by man and the natural succession of cypress swamps into oak-hickory climax forest.

In addition to its long natural history, Battle Creek Swamp has had a long human history. Captain John Smith's map of Virginia and the Chesapeake Bay area, published in 1608, shows the largest of the Indian villages in Calvert County at the mouth of Battle Creek, and the Stearns (1951) reports finding three Indian shell heaps along the banks of Battle Creek. According to Stein (1960), these Indians were members of the Piscatoway tribes, an agricultural people.

The name "Battle Creek" was given to the stream by one of the area's first settlers, Robert Brooke. He named it after Battle, England, the site of the Battle of Hastings, where his wife's family had lived. Brooke built himself a fine home, Brooke Place Manor, on Battle Creek and laid out plans for a town on the north bank. The town, settled in 1650, and known as Calvert Town, was the county seat until 1725. Calvert Town was destroyed in 1814, when the British landed a raiding party at Battle Creek (Stein, 1960).

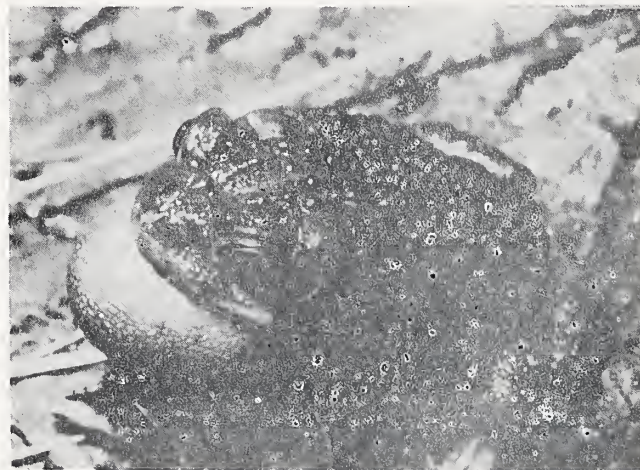
The swamp itself has had a number of owners, the first of which was Thomas Letchworth, an early Puritan settler. The swamp was part of a land grant known as Letchworth's Cypress (Stein, 1960). Since colonial days, the valuable cypress wood has been used for many purposes, chiefly boat-building, and the swamp has therefore been cut over many times. The remaining cypress is almost all second and third growth, although a very few old trees remain. Logging operations continued into the 1940's, and it was not until the mid-1950's that steps were taken to preserve the swamp. In 1956, the Nature Conservancy, aided by funds raised by the Federated Garden Clubs of Maryland and interested local citizens, bought the swamp and established it as a natural preserve. In 1965, the National Park Service designated the swamp a Registered Natural Landmark, thus insuring its future availability for the study of its interesting natural history. (Nature Conservancy, 1965).

Battle Creek Swamp is approximately 100 acres in area, and in 1907 it was found to be 93% cypress (Md. Geological Survey, 1907). It is located in the Western Shore of Maryland's Coastal Plain, and is therefore typical of Coastal Plain swamps. Small streams wind through the swamp, and cypress knees thrust their pointed spires up through the mud and water, waiting to trip the unwary naturalist and send him sprawling in the mud (personal experience). Even more treacherous are the bottoms of the streams, which are filled with deep, sticky mud which tugs at one's boots with every step. The swamp is not



Fig. 1 - View of Battle Creek Cypress Swamp, showing one of the larger cypress trees and some of the many cypress knees found throughout the swamp.

Fig. 2 - The American Toad (*Bufo americanus*) can often be heard calling in the swamp in April and May.



all mud and water, however, and in the drier portions one encounters the tracks of deer, mink, opossums, and raccoons along the stream banks. Many bird species inhabit the swamp. I have on several occasions seen the beautiful pileated woodpecker there as well as a pair of ospreys which nest in a tall cypress downstream from where the road crosses Battle Creek. It is the herpetology of the area, however, which primarily concerns us here.

I first visited the swamp in April 1964. Since then, I have visited it in April, May and June of various years, so I have had an opportunity to see a good sampling of the reptiles and amphibians present during these months. As a habitat, Battle Creek Swamp is similar to the large cypress swamps of the South, with tall, buttressed cypresses standing in pools of still, dark water. Arrowhead, Pickerel-weed, and Golden Club are prevalent in the swampy pools. Absent, however, are many of the forms of life commonly associated with cypress swamps. There are none of the great festoons of Spanish moss typical of southern swamps, nor are there cottonmouths and many other reptiles and amphibians which inhabit the warmer states.

Until recently, one typical southern cypress swamp inhabitant was believed to be found in Battle Creek Swamp, and it has puzzled herpetologists since its occurrence was reported twenty years ago. This is the Pine Woods Treefrog (*Hyla femoralis*). James A. Fowler and Grace Orton (1947) reported that this species had been found in the swamp in 1937. They pointed out that it is often associated with cypress swamps in the South, so it could reasonably be expected to occur in Battle Creek Swamp and the cypress swamps on the Eastern Shore. However, despite intensive searching, this species has never again been found in Maryland, and its occurrence in the state is now considered doubtful (Harris, 1967).

Despite the apparent absence of this interesting southern species, I have found Battle Creek Swamp to be rich in other reptiles and amphibians. When one enters the swamp in April, there is very little undergrowth on the land or in the water, and the cypress trees are still virtually devoid of leaves. (Cypress is one of the few conifers that sheds its leaves.) Water in the swamp is plentiful at this time, providing numerous breeding areas for amphibians. I have found the eggs of the Spotted Salamander (*Ambystoma maculatum*) well developed and hatching in April, and the swamp rings with the calls of Spring Peepers (*Hyla crucifer*), Upland Chorus Frogs (*Pseudacris triseriata feriarum*), and American Toads (*Bufo americanus*). An occasional Green Frog (*Rana clamitans melanota*) or Cricket Frog (*Acris crepitans*) can be heard calling. Southern Leopard Frogs (*Rana pipiens sphenoccephala*), Wood Frogs (*Rana sylvatica*), and Pickerel Frogs (*Rana palustris*) are common along the stream banks. Red-spotted Newts (*Diemictylus v. viridescens*) conduct their mating "dances" during this month.

Among the reptiles, the turtles are the most conspicuous, and in April, when the streams are full, the aquatic turtles are especially plentiful. Painted Turtles (*Chrysemys p. picta*), and Red-bellied

Turtles (*Pseudemys rubriventris*) are common in Battle Creek. In the shallower, more swampy areas, Spotted Turtles (*Clemmys guttata*), Mud Turtles (*Kinosternon s. subrubrum*), and an occasional Stinkpot (*Sternotherus odoratus*) have been found. The master of the aquatic portions of the swamp is the Snapper (*Chelydra serpentina*), probably the most important predator of smaller fish, amphibians, and reptiles. In April 1965, I found a twenty-five or thirty pound specimen with a head the size of a tennis ball. Box Turtles (*Terrapene c. carolina*) inhabit the drier parts of the swamp, but they are less common in April than later in the year.

Snakes are not common in the swamp in April, and they are never very plentiful, but an occasional Black Racer (*Coluber constrictor*) or Northern Water Snake (*Natrix s. sipedon*) may be seen. I have never found any lizards in this swamp, although Mansueti (1955) states that two species inhabit the area. McCauley (1945) gives a Battle Creek record for the Ground Skink (*Lygosoma laterale*).

In May and June, the swamp becomes drier and poison ivy and tangled briars cover the land, while dense stands of pickeral weed fill the open water. The reptiles and amphibians found in April for the most part remain active, although the Chorus Frogs and Spring Peepers have disappeared. Green Frogs, Pickeral Frogs, and Leopard Frogs are more common, and occasional Fowler's Toads (*Bufo woodhousei fowleri*) are found. The deep calls of the Bullfrog (*Rana catesbiana*) can be heard in the larger pools, especially in the deep marshy area downstream from where the road crosses Battle Creek. There the cypress swamp begins to give way to an estuary and the water becomes more brackish. I have also found Green Frogs and Cricket Frogs breeding in this area. In shallow ponds in the swamp and in ditches along the roadside, Grey Treefrogs (*Hyla v. versicolor*) can be heard calling, with the clicking calls of Cricket Frogs. Marbled Salamander larvae (*Ambystoma opacum*), hatched from eggs laid in the fall have been found in the process of transformation.



Fig. 3 - The Grey Treefrog (*Hyla v. versicolor*) often heard calling along the road near the swamp.



Fig. 4 The box turtle (*Terrapene c. carolina*) is very common in the drier portions of the swamp.

Fig. 5 A large Snapper (*Chelydra serpentina*) found in the swamp in 1965. It weighed an estimated 25 or 30 pounds.



The aquatic turtles are less evident in the drier months, and Box Turtles seem to be the most common species. However, Mud, Spotted and Painted Turtles, as well as Snappers, can still be seen. Mansueti (1955) states that the Diamondback Terrapin (*Malaclemmys t. terrapin*) has been observed in Battle Creek estuary. More Northern Water Snakes and Black Racers are seen in May and June, and in the drier areas the Worm Snake (*Carphophis a. amoenus*), Garter Snake (*Thamnophis s. sirtalis*), and Black Rat Snake (*Elaphe o. obsoleta*) have been found.

In addition to the amphibians and reptiles which I have observed, Mansueti (1955) reports that the Red-backed Salamander (*Plethodon c. cinereus*), Four-toed Salamander (*Hemidactylium scutatum*), Dusky Salamander (*Desmognathus f. fuscus*), and Two-lined Salamander (*Eurycea b. bislineata*) have been found in the swamp. Fowler (1941) found the Mud Salamander (*Pseudotriton montanus*) there. Mansueti (1955) states that seven species of snakes and two species of lizards inhabit Battle Creek Swamp, but did not list them.

A total of 15 frogs and toads, 9 salamanders, 10 turtles, 17 snakes, and 5 lizards have been recorded from Calvert County (Cooper, 1965). However, not all of the reptiles and amphibians reported from the County have been found in the swamp. Neither the Eastern Spadefoot Toad (*Scaphiopus h. holbrookii*) nor the Green Treefrog (*Hyla cinerea*) have, to my knowledge, been reported here. The northernmost point from which the Narrow-mouthed Toad (*Gastrophryne c. carolinensis*) has been reported is apparently Cove Point, somewhat South of Battle Creek (Mansueti, 1942). The only salamander recorded from the county which has not been recorded from Battle Creek Swamp is the Northern Red Salamander (*Pseudotriton ruber*). The only two turtles not found in the swamp which have been recorded from the county are marine species (Schwartz, 1967). The data on snakes and lizards is probably incomplete, and more species may inhabit the swamp than have been reported. However, the Copperhead (*Agkistrodon contortrix mokeson*), the county's only venomous snake, apparently does not frequent the swamp (Mansueti, 1955).

Battle Creek Swamp offers a unique opportunity for city dwellers and suburbanites to observe first-hand the various natural features of a cypress swamp only a few miles from modern urban development. It is a prime example of what can be done to save small, but important natural areas from destruction. Yet it is also a reminder of what we have lost. It is a remnant of a vanished wilderness that will never return.

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Reidentification of two Maryland *Pseudemys*

Nemuras (1964) states that a fragment of a *Pseudemys f. floridana* shell was found at Swan Creek, Anne Arundel County, Maryland, on 11 April 1964. This turtle shell is that of a *Pseudemys rubriventris*, not *P. f. floridana* and is presently catalogued RT72HSH in the author's collection.

The *Pseudemys f. concinna* mentioned by McCauley (1945), USNM No. 45564 was also found to be a juvenile *Pseudemys rubriventris*.

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Ed. note: In "Battle Creek Cypress Swamp" ...*Bufo americanus* should read *Bufo a. americanus*, *Hyla crucifer* sr. *Hyla c. crucifer*, *Acris crepitans* sr. *Acris c. crepitans*, *Rana sylvatica* sr. *Rana s. sylvatica*, *Rana palustris* sr. *Rana p. palustris*, *Diemictylus v. viridescens* sr. *Notophthalmus v. viridescens*, *Pseudotriton ruber* sr. *Pseudotriton r. ruber*, *Pseudotriton montanus* sr. *Pseudotriton m. montanus*, *Chelydra serpentina* sr. *Chelydra s. serpentina*, *Coluber constrictor* sr. *Coluber c. constrictor*.

